

NETWORK WORLD

The Newsweekly of User Networking Strategies

Volume 8, Number 46

An International Data Group Publication

November 25, 1991

FEATURE

User Excellence Awards go to TI and Columbia Gas

There's a simple concept behind *Network World's* annual User Excellence Awards: honor the organizations that have built enterprise networks to gain a competitive edge.

While the concept is simple, the reality is that building and managing such networks is an arduous enterprise requiring a mix

of managerial savvy, technical wizardry and just plain hard work. The awards celebrate users with the insight and dedication needed to tap the true promise of networking.

The selection process this year was difficult — a cliché, but true. However, eight organizations emerged as leaders, including



PHOTO © 1991 WALTER CALAHAN
Columbia Gas team is betting that net upgrade will pump up profits.



PHOTO © 1991 STAN WOLENSKI
TI's George Chrisman leads net team's run to perfection.

cowinners Columbia Gas Transmission Corp. and Texas Instruments, Inc.

Columbia Gas was cited for its commitment to network innovation even in the face of corporate upheaval. The company is investing \$21 million to build an enterprise network seen as key to its financial turnaround.

In TI's case, networking has had a dramatic impact on manufacturing operations and the competitiveness of this global giant. Simply said, TI is zealous in its pursuit of network excellence.

Six users won honorable mention for achievements in such areas as downsizing, internetworking and net management. Stories on the winners and honorable mentions begin on page 28.

Network World will present this year's awards during a ceremony at the Communication Networks '92 conference in January.

DEC, Microsoft team on Windows initiative

Will work to bring Windows clients into Pathworks, All-In-1; DEC to distribute Windows applications.

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. last week unveiled a raft of work group computing software that allows Microsoft Corp. Windows 3.0 users to access and share data in DEC Pathworks and All-In-1 environments.

DEC and Microsoft also announced an expanded partnership agreement under which Microsoft will enhance its Windows applications to support key DEC efforts such as its Compound Document Architecture (CDA) and Network Application Support (NAS) services. DEC will also sell and support a number of Microsoft Windows applications.

Separately, Lotus Development Corp. said it will integrate its Windows applications — 1-2-3 for Windows, Ami Pro 2.0 and Freelance Graphics — with DEC's new work group tools.

The new products, which were introduced to DEC's Pathworks software developers two weeks ago ("DEC to unwrap Pathworks pack for office automation," *NW*, Nov. 11), allow Windows users to retrieve and exchange data on Pathworks-based local-area network servers, as well as commu-

nicate with other DEC users across an enterprise via the All-In-1 office system.

"One of the challenges is to get Windows clients integrated into the companywide environment," said Henry Ancona, DEC's vice-president of information systems and applications. "This (continued on page 50)

INSIDE



PHOTO © 1991 WALTER CALAHAN

Apple's Roger Heinen Jr. talks open systems with users. See story, page 2.

N.Y. carriers back plan for mutual aid

By Bob Brown and Bob Wallace
Network World Staff

NEW YORK — A task force of users, carriers and government officials last week mapped out a plan here under which carriers will back up one another to restore service in the event of a major outage.

The Mutual Aid and Restoration plan — the first of its kind in the nation — could serve as a model for local and state governments to minimize the impact of carrier outages on businesses.

"This is a definite step toward having carriers share their resources in the event of outages," said Kenneth Phillips, chairman of the Committee of Corporate Telecommunications Users and vice-president of Citicorp's Office of Telecommunications Policy. "It's a considerable improvement over the status quo."

(continued on page 49)

NET embraces DME as base for net mgmt. applications

By Paul Desmond
Senior Editor

REDWOOD CITY, Calif. — Network Equipment Technologies, Inc. (NET) last week unfolded plans to support the OSF's Distributed Management Environment (DME) in an effort to unify its various network management tools.

The move — which makes NET the first T-1 multiplexer maker to pledge support for the Open Software Foundation, Inc.'s nascent DME — will let NET focus on developing management applications specific to its equipment, rather than building and enhancing a complete integrated net management system.

NET's applications would work with a DME-based management system that users would purchase from companies such as IBM and Hewlett-Packard Co.

"It should significantly cut the amount of development we have to do," said Karyn Mashima, vice-president of marketing at NET. "That should be a major benefit for users because now we can spend our time writing applications and not just rewriting the same base environment."

As part of the plan, NET announced its NetOpen software, a series of management applications that will eventually be able to share data with other vendors' (continued on page 50)

NETLINE

CISCO RESHAPES PLANS to support native SNA routing, will only support limited PU 4 capabilities. Page 4.

WORLD COM SEEKS partner to lift it out of multimillion-dollar deficit. Page 4.

WELLFLEET UPGRADES FDDI module to boost performance

and add filtering capabilities. Page 6.

FCC ALLOWS REGULATED BOCs to offer enhanced services. Page 6.

CABLETRON UNVEILS net management module, new twisted-pair token-ring modules. Page 6.

Nationwide, high-speed net approved by the House

Sources say Senate could add its approval for the gigabit research net as early as this week.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — A bill that would lead to the creation of a nationwide research network supporting speeds up to a billion bits per second passed the House last week and is expected to pass the Senate early this week.

The bill, called the High-Performance Supercomputing Act of 1991, which emerged from the House-Senate compromise process without the protectionist language that garnered an earlier veto threat from the Bush administration, calls for the establishment of the National Research and Education Network (NREN) by 1996. The network would sup-

port gigabit speeds when technically feasible.

The bill's final passage, which seems assured, represents a victory for Sen. Albert Gore (D-Tenn.), who worked for 10 years to persuade Congress and two Republican administrations to support his NREN plans.

The compromise bill, shaped by Gore staffers, strikes a remarkable balance between the various Washington power factions.

The House Democrats proposed restricting foreign participation in the NREN project, and critics in Congress and the Bush administration called govern-

(continued on page 51)

Vendors warn buyer apathy may imperil open systems

Claim users lean too much to non-OSI products.

By Wayne Eckerson
Senior Editor

RESTON, Va. — A panel of high-ranking executives from leading computer companies last week told attendees at a conference here the biggest impediment to open systems is the fact that users aren't buying them.

At the User's Open Systems Conference here, vendors turned the tables on an audience of 250 users who were supposed to grill the panelists on their companies' commitment to open systems.

Instead, the vendors said that, based on buying patterns, users are more interested in purchasing proprietary systems or products based on quasi-standards

such as the Transmission Control Protocol/Internet Protocol than the open systems offerings vendors sell today.

Panelists said that until they see sufficient demand for open systems technology, they will not invest heavily in developing such products.

"If you want open systems, you must buy them," Roger Heinen Jr., vice-president at Apple Computer, Inc., told attendees. "That's the only language we understand."

The so-called Industry Power Panel was composed of top executives from Allen-Bradley Co., Apple, Digital Equipment Corp.,

(continued on page 8)

Windows NT looms as new competitor on server front

Last of a three-part series analyzing Microsoft Corp.'s networking strategy.

By Timothy O'Brien
West Coast Bureau Chief

Although many vendors today have accepted the fact that they will have to support Microsoft Windows clients in local-area networks, they are bracing for a battle with Microsoft in the server and network services arenas.

Analysts say Microsoft is paving the way for Windows NT — its 32-bit server operating system due late next year — by recruiting developers to build a bevy of

applications and network services around its set of Windows, messaging and even database application program interfaces (API).

"Microsoft's plan is to capture the lion's share of the application development dollars so that when NT comes out, there will be applications and services ready to go," said John Rymer, vice-president of Patricia Seybold's Office Computing Group in Boston.

Even though Microsoft is promoting these APIs as open, industry watchers warn there is a risk

(continued on page 6)

Briefs

Ungermann-Bass after NetWorth?

Ungermann-Bass, Inc. said it will make an announcement Dec. 2 regarding a 50% investment in an unnamed company that sources have identified as NetWorth, Inc., a Dallas-based maker of low-end 10Base-T local-area network hubs. Ungermann-Bass would neither confirm nor deny the rumor, but NetWorth President John McHale denied it.

Analysts said the move would make sense because it would give Ungermann-Bass a more scalable product line — its Access/One is a high-end hub — and augment its direct sales force with a new distribution channel.

Teleport makes switched bid.

Teleport Communications Group (TCG), an alternative access service provider, last week said it will ask the Illinois Commerce Commission for approval to offer switched voice services for users served by its Chicago network. TCG, which operates all-fiber networks in seven cities, wants to offer Centrex and shared-tenant services that would compete directly with those offered by Illinois Bell Telephone Co. TCG, which is evaluating central office switches for its 10-route-mile Chicago net, already offers Centrex and tenant services in New York.

MCI launches 800 Guardian feature.

MCI Communications Corp. last week announced a feature for its MCI 800 service that guarantees customers that 800 calls will be routed to another line, site or recorded message in the event of an outage. With the feature, dubbed MCI 800 Guardian, customers are guaranteed restoration within 30 minutes of a disruption. However, the guarantee does not apply to conditions beyond MCI's control, such as natural disasters. If MCI can not restore service in the allotted time, it will credit the customer a one-month service charge. AT&T announced a similar program in 1989.

CrossComm looks to OpenView.

CrossComm Corp. this week is expected to announce a network management system for its ILAN bridge/routers based on Hewlett-Packard Co.'s OpenView. The new system will retain the functions of CrossComm's existing ILAN Management System (IMS), including the ability to handle IBM bridges

and exchange data with IBM's Network Manager. But CrossComm has improved IMS by building in an intuitive graphical user interface and using the Simple Network Management Protocol (SNMP) to give users the ability to interrogate other SNMP-compatible devices and management systems.

BellSouth to be Aussie carrier.

The Australian government last week selected a consortium lead by BellSouth Corp. and Cable & Wireless PLC to establish the first full-service competitor to the country's monopoly domestic and international carriers, Auralian Telecommunications Corp. and OTC, Ltd., respectively. The consortium, Optus Communications, of which BellSouth and Cable & Wireless each own one-quarter, plans to begin offering services next year.

Lotus taps new technology chief.

Lotus Development Corp. last week named John Landry, previously executive vice-president and chief technology officer for Dun & Bradstreet (D&B) Software, as its senior vice-president of software development and chief technology officer. He will be responsible for defining Lotus' technical direction and will oversee development of the company's applications and communications products, including Notes groupware. While at D&B Software, Landry was responsible for developing the company's client/server architecture.

Landry replaces Frank King, who resigned effective the end of 1991.

ONA gets final polish.

The Federal Communications Commission last week put the finishing touches on its Open Network Architecture (ONA) proceeding, a key element of the Third Computer Inquiry that requires the regional Bell holding companies to unbundle network elements and offer services to rival enhanced service providers or users on a nondiscriminatory basis. The FCC ordered the RBHCs to submit annual reports on April 15 that provide information such as deployment plans for ONA services by geographic region, ONA service requests from customers, level of deployment for new technologies such as Common Channel Signaling System 7 by access lines and progress on uniformity of ONA services across RBHCs countrywide. □

CONTENTS

Industry Update

Industry frets over boom in E-mail APIs. 9
Vitalink merger enables firm to bolster product mix. 9

Telecommunications

Newspaper trials mix of net technologies. 11
AT&T earmarks \$3b for 1992 network upgrades. 11

Data Communications

Firm rebuilds claims, customer service nets. 13
DEC preps ACA software for IBM MVS mainframes. 13

Local Networking

Apple architecture to spur cooperation. 17
Interlink offers TCP/IP, NFS wares for LAN micros. 17

Management Strategies

Goal definition key to quality programs. 19
Users put bulletin boards to work as meeting forum. 19

Global Networks

U.S. seeks common virtual net standard. 21
ISDN making steady strides across European market. 21

Products & Services

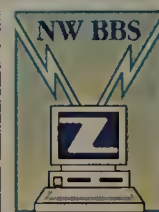
Firm's software to link Windows worlds. 23

Opinions

Fax: It's a long way from being obsolete. 24
New mgmt. applications herald a practical era. 25

Action Center

Networking Marketplace 46
Networking Careers 47

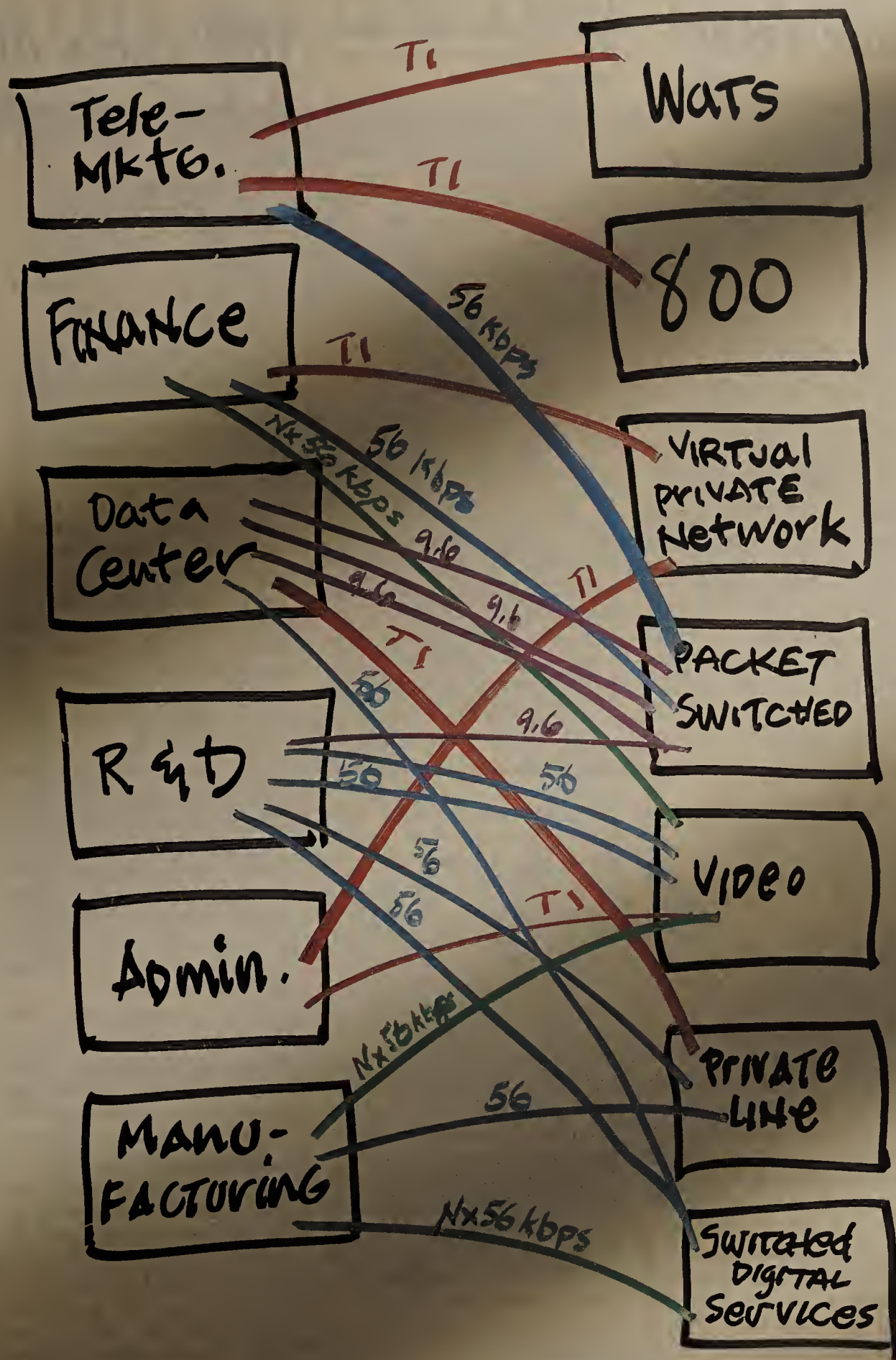


NW Bulletin Board.

Contact us electronically. Our BBS lets you submit letters to the editor, pass on tips, leave change of address requests, interact with other readers, download free software and hunt for jobs.

Use your IBM, Apple or other microcomputer to reach the BBS at 300 to 2,400 bit/sec (8N1) by dialing (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. You can speak to us directly by calling (800) 622-1108.

Article reprints (minimum 500 copies) can be obtained from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172; (508) 875-6400.



NETWORK ON ELM STREET.

The way networks keep growing these days, you can wind up with a real nightmare. Besides standard voice networks, you have to think about all types of data networks. And the more you grow, the worse it gets. Because the tradi-

onal way is to use at least one line for every service. But at Sprint, we can integrate all your access facilities onto one simple T-1. Whether you need T-1 partitioning, ISDN, or a combination of both. It's called Integrated Access. It helps you cut idle capacity. Cut access costs. And instead of managing

more networks than you can count, you manage one. We also have a wide range of CPE, so you can put the whole thing together by calling one source.

If you'd like to know more, just call 1-800-729-8133. We'll send complete information to your fax

machine in minutes. And we'll show you the only way to handle a nightmare. Don't have a sequel.



© 1991 US Sprint Communications Company Limited Partnership.

AT&T bases frame relay service on StrataCom IPX

But won't make long-term commitment to switch.

By Bob Wallace
Senior Editor

NEW YORK — As expected, AT&T last week introduced a nationwide frame relay service based on StrataCom, Inc. IPX multiplexers but admitted its long-term frame relay plans are not yet etched in stone.

The company is already evaluating alternative switches, including one of its own, to serve as the foundation of a future cell relay-based frame relay service.

"We feel that StrataCom provides the right solution now, but we can't commit to the length of time we will stay with the product," said Rich Roca, AT&T Bell Laboratories' executive director of business special services development and engineering.

AT&T's frame relay network comprises more than 20 IPXs networked using T-1 circuits, but eventually, the carrier wants to offer frame relay service from faster and more powerful cell relay switches.

AT&T had hoped to base the new service on its Network Systems group's Broadband Networking Switch (BNS)-2000, but the switch is still in development, so it opted for the IPX. WilTel and CompuServe, Inc. already use the StrataCom mux to deliver their frame relay offerings.

"AT&T was under a tremendous amount of pressure from customers and the marketplace to roll out a frame relay service," said Nick Lippis, a principal with Strategic Network Consulting,

Inc., a Rockland, Mass., consultancy. "They had to get something out there fast."

Lippis said the decision to use the StrataCom IPX was wise because many vendors have already certified their bridges and routers for use with the switch. "More than 90% of the connections going into StrataCom boxes [used to support frame relay services] are from Cisco [Systems, Inc.] routers. And Cisco holds over 50% of the router market," he said. "This will enable AT&T to quickly address a large market."

But analysts said AT&T's refusal to commit to the IPX beyond the next year or two may scare away some potential customers.

"You have to wonder how many customers will be attracted to a service that may be supported from a different platform down the road," said Steve Sazegari, a principal analyst with Dataquest, Inc., a San Jose, Calif., research firm. "Users may question AT&T's commitment to the
(continued on page 8)

Cisco revamps plans to support native SNA routing

By Maureen Molloy
Staff Writer

MENLO PARK, Calif. — In an effort to squelch industry speculation that it is abandoning plans to enable its router to emulate IBM front-end processors, Cisco Systems, Inc. last week said it is making progress with the plan but has modified its strategy.

Cisco is backing off from its original mission to enable its routers to support Systems Network Architecture data in native mode and is now saying its routers will have limited PU Type 4 capabilities.

"The router will not be a pure PU 4 device," said Don Listwin,

product-line manager for routers at Cisco. "After doing more work on the project, we've decided that our router will only mimic PU 4 properties customers want."

Cisco is also retreating from its original shipment schedule. In its initial announcement, the vendor said PU 4 functions would be delivered by the end of this year ("Cisco turns AGS line into SNA routers, NW, Feb. 4), but it later revised the schedule, saying it would be in beta test by year end.

Shipment of PU 4-capable routers have now been delayed until the third quarter of 1992.

Cisco has a five-phase plan to support IBM SNA and token-ring

local-area networks. Phase 1, deployed earlier this year, enables token-ring LAN-attached routers to support SNA devices by encapsulating the protocols in Transmission Control Protocol/Internet Protocol packets.

Phase 2 addresses SNA devices that are not LAN-attached. As part of this phase, Cisco rolled out its Synchronous Data Link Control transport software, which uses TCP/IP to encapsulate traffic generated by devices such as cluster controllers.

In Phase 3, scheduled for shipment in the first quarter of 1992, Cisco will support source route transparent bridging on routers with token-ring interfaces, as well as translation bridging between bridged environments.

In Phase 4, Listwin said the company will start delivering
(continued on page 6)

WorldCom looks for mate to build net services base

WilTel emerges as top suitor among U.S. carriers.

By Barton Crockett
Senior Editor

NEW YORK — Fraught with multimillion-dollar losses, World Communications, Inc. (WorldCom) is talking with WilTel and other U.S. carriers about forming a partnership in which it could surrender operational control to an equity investor.

Despite pumping more than \$40 million in new capital into WorldCom since acquiring it for \$56 million in 1988, parent company TeleColumbus AG expects the international carrier this year will lose \$6 million to \$7 million on revenue of about \$90 million,

according to Franz-Anton Glaser, chairman and chief executive officer of TeleColumbus, based in Baden, Switzerland.

Last year, WorldCom lost about \$15 million, he said.

WorldCom has been hurt by AT&T and MCI Communications Corp., which are bundling domestic and international services into package deals the smaller carrier cannot match. This is because about 70% of WorldCom's revenues come from international private-line services, which have been hit by heavy discounting and now sell for about half of their 1988 price in many markets.

WorldCom is seeking to partner with a U.S. service provider to diversify into more profitable businesses and to expand its domestic services. TeleColumbus expects to finalize an agreement with a new U.S. partner by the end of March, Glaser said.

"We need additional services with better margins," he said.

WorldCom, based here, is one of the largest U.S. providers of international private-line services. TeleColumbus is a subsidiary of Motor-Columbus, Ltd., a billion-dollar Swiss conglomerate active in the energy and telecommunications industries.

WilTel tops the list of potential partners for WorldCom. Sources close to WorldCom, who requested anonymity, said the carrier has expressed interest in buying a majority stake in WorldCom, though TeleColumbus has
(continued on page 49)

IBM execs discuss router delay, reorganization plan

By Paul Desmond
Senior Editor

BOSTON — Senior IBM executives last week admitted the company will delay the announcement of a long-awaited router and revealed details about an ongoing corporate restructuring.

Ellen Hancock, vice-president and general manager of IBM's Networking Systems line of business, said the multiprotocol router, which was expected to be unveiled next month, will not be announced until early next year.

Hancock confirmed that IBM is in the midst of a reorganization, one result of which will be to shift responsibility for more products to her unit. She also fleshed out IBM's positioning of its OS/2 LAN Server network operating system vs. Novell, Inc.'s NetWare, which IBM now resells.

Separately, Rick McGee, manager of communication systems architecture in IBM's Networking Systems group, said Advanced Peer-to-Peer Networking (APPN) support for mainframes will be announced next year. And Hancock indicated that IBM was close to making public its APPN network node specification.

Both executives spoke at Forrester Research, Inc.'s 1991 Technology Management Forum here, the theme of which was "New Corporate Networks: The Impact of Interconnected LANs."

The multiprotocol router will play a key role in IBM's local-area network interconnect strategy. But Hancock said the need for further testing will delay announcement of the product.

"I had hoped to announce it before the end of the year," she said. "It now looks like, based on discussions I've had with the team, we'll announce it the very first part of next year."

Hancock did not say when the router will be delivered, but analysts said it will likely ship in the first half of 1992.

IBM reorganization

During a question and answer session at the conference, Hancock was asked about rumors that John Akers, IBM chairman and chief executive officer, would announce a sweeping reorganization next month.

Hancock acknowledged that a reorganization is under way, saying, "He sees the company more as a series of companies than a single IBM company. Changes are occurring that are subtle but very deliberate."

Among them are the shifting of product responsibilities among various lines of business. Networking Systems, for example, has picked up from Application Systems responsibility for electronic data interchange ap-

plication development and some CallPath-like enhanced telephony applications. Hancock's group has also acquired systems management and OS/2 Communications Manager development responsibility from other units.

Sources said Networking Systems will also obtain responsibility for SystemView, IBM's blueprint for systems and network management. Oversight for SystemView currently rests with the Enterprise Systems group.

"Networking Systems assuming responsibility for SystemView is a logical move," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "This will probably bring IBM closer to solving the management problem than if they had it with separate organizations."

APPN support

In the APPN arena, McGee said IBM would announce, and "maybe" ship, APPN support for its mainframes next year. That will ease the chore of configuring devices to VTAM and the Network Control Program, and enable more direct routing in Systems Network Architecture networks.

APPN is intended to simplify construction of SNA nets and support peer-to-peer routing between devices. IBM is currently shipping APPN for its minicomputers and OS/2 systems.

IBM also appears ready to make public the APPN network node specification, which is key to routing in an APPN net.

"We are working with some other vendors that are very interested in that specification," Hancock said, adding that Novell is high on the list of those vendors.

In discussing Novell, Hancock offered a new rationalization for IBM's decision to sell both OS/2 LAN Server and NetWare. Originally, IBM said it was simply responding to user requirements. But last week, Hancock said the products address different needs.

NetWare offers robust file and print server capabilities. LAN Server has those capabilities but is not as specialized. Rather, it is intended to be used with other server-based applications.

NetWare is analogous to TPF, a high-performance transaction processing monitor used for airline-specific applications, whereas LAN Server is like MVS/VTAM, which doesn't have the speed of TPF but supports a wider variety of applications, she explained.

Hancock said the operating system under development with Apple Computer, Inc. will be used as a desktop client. Development is under way between IBM and Novell so NetWare can work with the client operating system. □

EVEN WITH ALL THE TIME IN THE WORLD,



YOU STILL NEED GREAT INTERNETWORKING TECHNOLOGY.

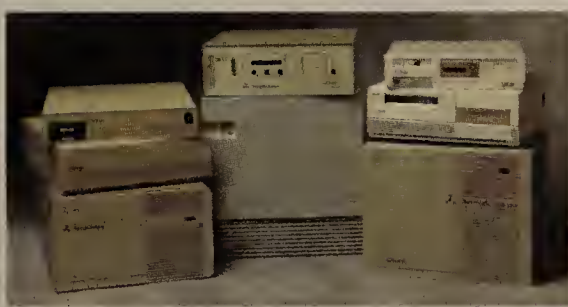
Vitalink. Delivering the right technology. And the time it takes to get it right.

At Vitalink, we've expanded our product line to include some of the most highly advanced routers and network switches in the world.

Yet, to fill your internetworking needs precisely, it takes more than just great bridges and routers. It takes a great listener. To give you all the time you need to communicate all your internetworking needs.

New products to ease your internetworking burden.

Vitalink now offers the industry's first scalable RISC-based bridge-routers. Also, Vitalink offers the best price-performance entry level systems designed to support FDDI. Plus, fault-tolerant enterprise-wide data switching systems that provide extremely reliable FDDI and T3 connectivity.



Announcing new bridge and router solutions from Vitalink.

You're probably not a 9 to 5 company. Neither are we.

Each of our worldwide offices is staffed with a dedicated network design expert—providing free network design and optimization consulting. What's more, we work closely with you to assure maximum network uptime—offering local trouble-shooting, on-site

maintenance and a round-the-clock hotline.

So, if internetworking pressures have you all wound up, let one of our Vitalink experts sit down with you—and put time on your side.

A timely book to make things tick. Free.

Call 1-800-551-3995 now for your free comprehensive, 104-page report:

*Building and Managing
Multivendor Networks
Using Bridge and Router
Technologies.*



VITALINK
IT'S ABOUT TIME.

Wellfleet improves speed, flexibility of FDDI module

By Maureen Molloy
Staff Writer

BEDFORD, Mass. — Wellfleet Communications, Inc. last week announced a second-generation Fiber Distributed Data Interface module for the company's multi-protocol bridge/routers that offers enhanced performance and new filtering capabilities.

The FDDI Link Module now offers transparent and translation bridging, enabling devices on an FDDI backbone to communicate with devices on token-ring or Ethernet local-area networks. The upgrade will also enable Wellfleet's bridge/routers to interoperate with other vendors' inter-network gear.

Wellfleet's existing FDDI module only supports encapsulation bridging, which handles transmission between devices on a single LAN type only, such as FDDI to FDDI. Interoperability is limited because each vendor uses its own approach to encapsulation.

In addition to new bridging capabilities, the module uses an advanced Motorola, Inc. FDDI Chip

Set component and a new filtering option that supports packet filtering at up to 500K packet/sec. The company's FDDI module uses an Amdahl Corp. chip set and does not support any filtering capabilities.

High-speed filtering is key for FDDI environments supporting applications with large bursts of traffic. Without it, the bridge can drop packets, forcing retransmission of data and increasing congestion on the network.

The Bridge Filter Accelerator option increases packet forwarding capacity via a separate Content Addressable Memory daughterboard. The filtering of bridge packets is off-loaded from the processor to the daughterboard.

The FDDI Link Module supports FDDI-to-FDDI bridging with a packet forwarding rate of 75K packet/sec. The existing FDDI module supports speeds of 8K to 15K packet/sec.

"By adding greater functionality on the FDDI card, Wellfleet is addressing the full range of FDDI campus interconnect

needs," said Martin Palka, a senior industry analyst at Dataquest, Inc., a San Jose, Calif.-based consultancy. "It's a mark that FDDI is beginning to mature and is now on its way to wider scale deployment by users."

The FDDI Link Module supports X.25, the Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems, Novell, Inc.'s Internet Packet Exchange (IPX) and Apple Computer, Inc.'s AppleTalk, as well as Open Systems Interconnection protocols.

"With support for multiprotocol routing and translation bridging, users can choose between routing and bridging on an application-by-application basis," said Karen Barton, Wellfleet's director of product marketing.

The module will be available next month. Wellfleet's Link Node and Backbone Link Node can support a maximum of four FDDI modules, while the Concentrator Node and Backbone Concentrator Node will support as many as 13 modules.

Pricing is based on configuration. For example, a Link Node configured with one FDDI and two Ethernet ports is priced at \$24,500. □

Windows NT a new competitor

continued from page 2

that Microsoft may go overboard with its plan to leverage Windows' popularity in order to improve sales of its own server and network services, which may alienate vendors and users.

"There is strength in numbers, and by pushing its own products, Microsoft could try to force users into making a difficult choice," said Frank Michnoff, an analyst with the META Group in Westport, Conn.

Mounting concern

Concern over this issue provides some insight into how important the emerging battle over servers and net services will be for the likes of Banyan Systems, Inc., Digital Equipment Corp., IBM, Novell, Inc., and others.

The competition will focus on servers and net services because, unlike Microsoft, which is building a strategy based on Windows, most of the companies recognize they will have to support heterogeneous types of clients ("Windows to be universal net interface," *NW*, Nov. 18). Besides Windows, most vendors expect to have to continue to write applications and drivers for DOS, Apple Computer, Inc.'s Macintosh, Unix and, potentially, OS/2 clients.

The success of Windows, however, is leading analysts to predict that IBM will now only make a halfhearted play for the desktop with OS/2 2.0 and instead focus on building partnerships and gathering support for its strategy at the server side, trying to protect its host-based view of the net.

Along these lines, IBM's recent agreement with Lotus Development Corp. to use pieces of its Notes product in OfficeVision and the whole Information Warehouse plan — designed to promote its own network database access infrastructure — show that IBM sees the server, network services and office applications areas as the next growth markets.

Like IBM, DEC will focus its ef-

forts on holding onto its piece of the server business; however, it is fully behind Windows as a client environment. Last week, DEC unleashed a bevy of enterprisewide office automation applications for Windows clients (see "DEC, Microsoft team on Windows initiative," page 1).

DEC concurs with Microsoft's belief that networks will always support a plethora of back-end networking resources accessible from a graphical user interface at the desktop, but believes users won't settle for Microsoft's universal client architecture.

"We see lots of environments where Macintosh and DOS clients are present," said John Rose, vice-president of DEC's Personal Computing Systems Group. "We certainly expect more network services to be available from the graphical user interface."

Novell, on the other hand, would like users to believe that Microsoft is simply following its lead since it is already possible to support Windows clients in Novell NetWare environments.

"We're delivering it while others are still talking about it," said John Edwards, director of marketing in the NetWare systems group in Provo, Utah. "And we're not starting from zero."

Analysts maintain, however, that Novell will not be able to ignore this shift in the network paradigm — in which users will be able to mix and match different vendors' network services — and eventually will need to reposition NetWare into more discrete network services and server components that can be better integrated into other vendors' offerings.

When pressed about some of Novell's shortcomings in a distributed network environment where Microsoft's Windows NT and other vendors' net services will be focused, Edwards said Novell will strive to integrate those services into NetWare for all clients equally, including DOS, Windows, Macintosh, Unix and OS/2.

Jim Duffy contributed to this report.

FCC to let regulated BOCs offer enhanced services

Reinstitutes Third Computer Inquiry rules from 1986.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The Federal Communications Commission voted unanimously last week to allow the regional Bell holding companies to provide unregulated enhanced services through the same business units that offer regulated telephone services.

The decision reinstituted rules the FCC originally issued as a result of the Third Computer Inquiry in 1986. That proceeding end-

ed a previous requirement that the RBHCs offer enhanced services through separate business operations and instead allowed them to offer those services through the telephone companies, subject to safeguards to prevent cross-subsidies.

The agency was forced to revisit the issue after a federal appeals court last year said the FCC had failed to compile enough evidence to support its rule change and sent the case back for review. Since then, the FCC has gradually

reinstated a number of less controversial Computer III rules and last week's decision closed the final chapter on the matter.

Carriers, regulators and users have bitterly clashed over the FCC's efforts in Computer III and predict drastically different consequences of this decision.

Some say that by combining enhanced and regulated operations, the RBHCs will gain operating efficiencies that enable them to cut rates. Others argue that such consolidation opens the door for the telephone companies to raise rates on captive ratepayers to subsidize the start-up of enhanced service operations.

Additionally, the decision has stirred up strong emotions from state regulators who complain

(continued on page 8)

Cabletron adds hub cards for token ring, net mgmt.

By Bob Brown
Senior Editor

ROCHESTER, N.H. — Cabletron Systems, Inc. last week unveiled a RISC-based network management module designed to manage 4M or 16M bit/sec token-ring nets attached to its Multi Media Access Center (MMAC) wiring hub.

Cabletron also introduced new shielded and unshielded twisted-pair cable token-ring modules for its hubs, each of which supports 24 ports, double

the number of ports offered on earlier token-ring modules.

The company's new Token-Ring Management Module (TRMM) will appease users who demanded token-ring management at the hub level, said Michael Welts, Cabletron's marketing director.

The TRMM, which takes up a single slot in the MMAC hub, represents a new direction for Cabletron in that it uses an Intel Corp. i960 Reduced Instruction Set Computer microprocessor to de-

liver 30 times more performance than the firm's Ethernet net management module. The Ethernet module is based on an Intel 80186 microprocessor, said Tedd Frechette, Cabletron's token-ring product manager.

The i960 will be the platform for all new Cabletron net management modules, he added.

The TRMM allows users to isolate faulty nodes on a token-ring and shut down those nodes so they don't affect overall local-area network performance. The TRMM can also be used to monitor activity across a token-ring network down to the station level and collect statistics on this activity for historical analysis, he said.

(continued on page 49)

Cisco plans to support SNA

continued from page 4

some of the services currently provided by a PU 4 front-end processor. To obtain these capabilities, Cisco last year teamed up with Cambridge, Mass.-based software firm Brixton Systems, Inc. The agreement calls for the two companies to port Brixton's SNA routing software to Cisco's routers, thus letting them emulate a PU 4 device.

The first fruits of its alliance with Brixton will be revealed next month, Listwin said, when Cisco announces native support for NetView by enabling its NetCentral network management station to ship management data to Net-

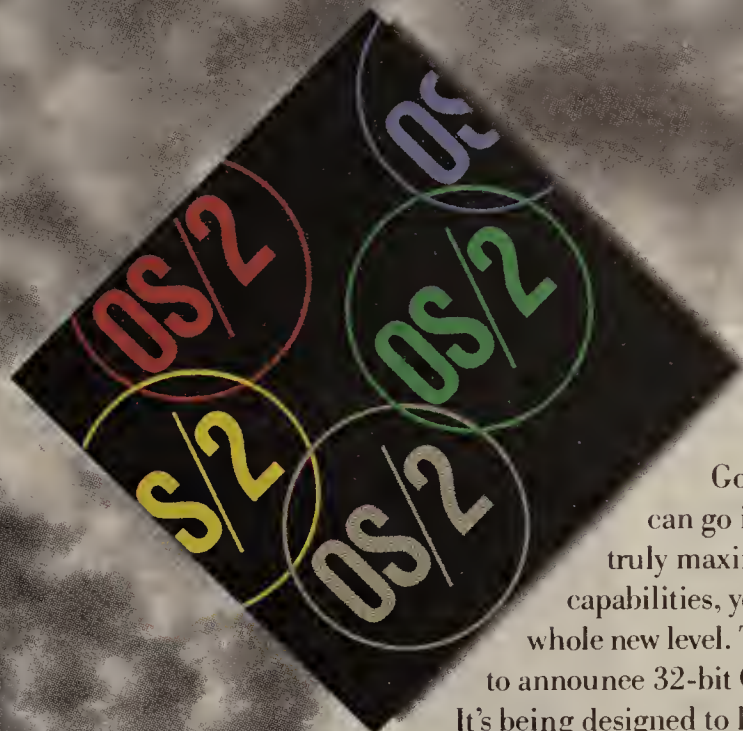
View using the Simple Network Management Protocol.

Most other PU 4 properties will be made available in the third quarter of next year. Listwin said the router will provide transmission group service for front-end processor-to-front-end processor traffic as well as SNA Class of Service, under which users can prioritize traffic to ensure that high-priority traffic has access to the backbone.

The front-end functions Cisco does not plan to support include channel attachment to hosts and SNA Network Interconnection.

Phase 5 of the plan, which is spelled out in a statement of direction, calls for support for PU 2.1 and IBM's Advanced Peer-to-Peer Networking. □

Why be content to run when you can fly?



Going as far as you can go isn't far enough. To truly maximize your computing capabilities, you have to function at a whole new level. That's why we're proud to announce 32-bit OS/2® Version 2.0.

It's being designed to let you run OS/2, DOS and Windows™ applications from a single system, with more available memory, true multi-tasking, application protection and a 32-bit base system that will keep you out in front.

With DOS, Windows and OS/2 support, 32-bit OS/2 2.0 will rise above the software compatibility barrier of the past, giving you access to thousands of applications created for those environments. So OS/2 2.0 protects your software investment as well as preserves your software choices. And that's increasingly important as more and more applications become available. As a platform for integration, nothing else even comes close.

No less of a breakthrough is the Workplace Shell interface that's being designed to remove even more of the obstacles of yesterday's computing environment. This friendly, graphical interface will make personal computing easier than ever and more powerful too. Built-in interactive education will keep you up and running, and there are productivity tools, a high performance file system, games and more. So there's almost no limit to how far you can go.

Act now and you can start with OS/2 1.3 SE for just \$99 if you own IBM DOS—\$150 otherwise—and you'll be eligible to get an upgrade to OS/2 2.0 upon release at no extra charge.* To order OS/2 1.3, call 1 800 342-6672** or contact your authorized IBM dealer or IBM marketing representative. And find out how OS/2 2.0 can break through for you.

OS/2. Breaking through.

*OS/2 2.0 is scheduled to be released in March 1992. IBM DOS to OS/2 1.3 upgrade offer is good through 12/31/91. **In Canada call 1 800 465-1234. IBM and OS/2 are registered trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. © 1991 IBM Corp.

Vendors warn of buyer apathy

continued from page 2

Hewlett-Packard Co., IBM, NCR Corp. and The Santa Cruz Operation, Inc. (SCO).

The two-hour session covered a range of topics, including whether vendors considered DOS and TCP/IP true open systems, whether they will actively try to bring about the convergence of Unix International, Inc. and the Open Software Foundation, Inc., and whether open systems should be based on standardized products or standard interfaces.

The panel was assembled by the User Alliance for Open Systems (UAOS), a group of information technology managers from about 50 major U.S. firms who are committed to accelerating the pace of open systems development. The UAOS sponsored the week-long conference here along with the North American MAP/TOP Users Group, the Electrical Power Research Institute and the North American ISDN Users' Forum.

Ellen Hancock, vice-president and general manager of IBM's Networking Systems business unit, said IBM builds products to meet customer needs — products customers will buy. "Users need to tell us where to spend our money," Hancock said. "We all want to make a profit, which means we don't invest in things that customers won't buy. The customer makes the vote."

Don Davis, president of Allen-Bradley, a leading maker of computerized control systems for manufacturing plants, challenged users to sit down with his company and share their open systems migration plans.

"I guarantee that we will respond to your requests and by September [1992], we will have

the products in place," Davis said. "But we can't meet your needs if you don't tell us what you want."

Davis said only four of Allen-Bradley's customers have briefed the vendor on their plans for migrating to open systems.

If the panelists were unsure about users' desire for open systems products, they were certain that users want systems based on TCP/IP and other defacto standards such as the Simple Network Management Protocol as well as various proprietary communications protocols.

Hancock said that when users want to communicate between different vendors' systems, they ask for TCP/IP. She said the level of user interest in TCP/IP caught IBM by surprise.

"We believe that OSI is the best architectural response for communications among different vendor systems, and we are roll-

ing out OSI products across all our sectors. But our customers are buying TCP/IP, and that's what we are giving them," Hancock said.

Both Hancock and Domenic LaCava, vice-president of Unix-based software and systems for

DEC, said their companies will continue to support TCP/IP, OSI and proprietary communications protocols well into the future. "The future is not one of transition [to OSI] but of coexistence [among TCP/IP, OSI and other protocols]," LaCava said.

Larry Michels, president and chief executive officer of SCO, elicited cheers from the audience when he said users are confused by the numerous forums and vendor alliances that have sprung up in recent years with conflicting agendas about how to develop and migrate to open systems.

"This confusion is good for IBM and DEC because it makes it easier for them to protect their proprietary interests," Michels said.

But Hancock denied that vendors have conflicting agendas. She said users are confused because they have so many choices. Allen-Bradley's Davis said it's difficult to get a consensus on open systems because user companies have different needs, which translate into different sys-



Ellen Hancock



PHOTOGRAPHY © 1991 WALTER CALAHAN

L. to r.: Domenic LaCava and Hewlett-Packard's Lewis Platt.

tems requirements. "It's not a matter of [vendors] protecting proprietary interests," Davis said. "It's a matter of meeting customer needs, which are based on customers' unique business objectives and operating environments."

Both Hancock and Domenic LaCava, vice-president of Unix-based software and systems for

DEC, said their companies will continue to support TCP/IP, OSI and proprietary communications protocols well into the future.

"The future is not one of transition [to OSI] but of coexistence [among TCP/IP, OSI and other protocols]," LaCava said.

Larry Michels, president and chief executive officer of SCO, elicited cheers from the audience when he said users are confused by the numerous forums and vendor alliances that have sprung up in recent years with conflicting agendas about how to develop and migrate to open systems.

"This confusion is good for IBM and DEC because it makes it easier for them to protect their proprietary interests," Michels said.

But Hancock denied that vendors have conflicting agendas. She said users are confused because they have so many choices. Allen-Bradley's Davis said it's difficult to get a consensus on open systems because user companies have different needs, which translate into different sys-

AT&T bases service on IPX

continued from page 4

[initial] service."

Industry watchers said that besides the switch decision, another factor hindering AT&T's willingness to roll out a frame relay service was the fact that the new service could cannibalize sales of private lines.

According to analysts, AT&T owns 90% of the private-line market and stood to lose some of that business to competitors' frame relay offerings. John Petrillo, vice-president of strategic planning for AT&T's Communications Services Group, said a growing number of users are moving away from private-line networks.

"We see a migration of customers from private lines to hybrid [nets] and, in some cases, to public data services in total," Petrillo said. "Users are now starting to commingle private lines with services like frame relay."

Petrillo could not say when it would make more sense to use frame relay than private lines. "It would have to be determined on a case-by-case basis," he said.

AT&T will offer frame relay service on a contract basis, rather than under a general tariff.

That pricing strategy could be both good and bad for users. On one hand, without set pricing, customers will have a difficult time determining where to use frame relay. But on the other hand, users may benefit by being able to negotiate custom pricing arrangements.

"AT&T is being vague on pricing," Sazegari said. "[Customer-specific] arrangements will provide a unique opportunity for large users to negotiate what they want but a problem for smaller users without clout."

According to Lippis, AT&T's pricing will determine how much its installed private-line customer base will erode.

"If AT&T prices frame relay 15% below private lines, it would turn a lot of heads and the [customer base] erosion could be as high as 30% to 40%," he estimated. "If frame relay is priced the same as private lines, you could expect a 5% erosion. And if it's priced above private lines, the erosion would be less than 5%."

Some analysts expect AT&T to price the service below private lines in order to keep customers from migrating to competitors.

"I expect AT&T to push frame relay aggressively," said Steven Taylor, founder of Distributed Networking Associates, a Greensboro, N.C., consultancy. □

AT&T touts SNMP tool

NEW YORK — AT&T last week announced a Simple Network Management Protocol (SNMP)-based performance monitoring tool for its frame relay service that analysts say differentiates its offering from those of competitors.

The software, developed by AT&T Bell Laboratories, runs under Unix System V. It enables customers to use an on-premises console to monitor the frame relay service in real time, receive alarms and keep a history of service performance.

AT&T technicians at the industry's first dedicated frame relay management center in South Plainfield, N.J., will also use the software to manage the network when the service goes into controlled introduction in the first quarter of 1992.

"We're giving users a window into their public frame relay network," said Tibor Schonfeld, a department head with AT&T Bell Laboratories in Holmdel, N.J.

Nonetheless, analysts say the software could give AT&T an edge over its rivals.

"Network management is the key differentiator between AT&T's frame relay service and what others offer," said Christopher Finn, an associate with TeleChoice, Inc., a Montclair, N.J., consultancy. "AT&T will

offer much more in the way of frame relay performance monitoring than anyone else."

The AT&T software addresses the Achilles' heel of public frame relay services. Of the companies that have rolled out frame relay services, none offers a customer premises-based monitoring tool.

With AT&T's tool, SNMP agents on each StrataCom, Inc. IPX in the network pass performance data back to customers' SNMP management stations.

Configuration data lists individual ports and port speeds on each device, logical and virtual connections to each device and the utilization percentage of each committed information rate (CIR), Schonfeld said. CIR is a guaranteed minimum amount of bandwidth for which users can subscribe with a frame relay service.

Alarm information includes notification when any link in the network becomes congested or goes down. It also provides notification when any port is lost, Schonfeld said. Statistics provided include the number of frames per second transmitted over each link in a frame relay network.

The software archives configuration data, alarm information and usage statistics.

— Bob Wallace

FCC reinstates Computer III

continued from page 6

that the federal agency is trying to limit their ability to regulate enhanced services in their local areas. The FCC decision takes away the states' ability to require separate subsidiaries for the RBHCs, except for purely intrastate enhanced services. It is unclear how many enhanced services would meet that definition.

Last week's FCC decision was the final step necessary for the RBHCs to begin offering enhanced services since it set out the business rules the carriers must follow. In October, the RBHCs were freed from a Modified Final Judgment restriction that banned them from providing most enhanced services.

Although another court challenge is possible, for now, the RBHCs can roll out enhanced services, such as information databases, voice mail and electronic yellow pages, through their telephone companies.

The RBHCs claimed in filings at the FCC that offering enhanced services using separate facilities and personnel could drive up the cost of those offerings by between 30% and 130%. If the services are too expensive to offer, the RBHCs say availability would also be restricted.

But user groups such as the Ad Hoc Telecommunications Users Committee and the International Communications Association disputed such claims. Two weeks ago, the Ad Hoc Committee submitted a study to the FCC, saying the RBHCs have based their esti-

mates on old data. Since then, more intelligence has been built into the public net that blunts the costs of maintaining separate facilities for enhanced services.

The Ad Hoc Committee study, conducted by Economics and Technology, Inc., contends that if the RBHCs save any money by offering services through their telephone companies, it will be because they will have special marketing advantages.

FCC Commissioner Ervin Duggan said he had concerns about allowing the RBHCs to consolidate unregulated enhanced and regulated telephone units. "We are heading into uncharted territory," Duggan said at the meeting last week. "I had some deep misgivings about the adequacy of nonstructural [accounting] safeguards." □

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“In announcing a frame relay service, AT&T had no choice but to respond to what amounts to a de facto requirement in any major RFP. All of their competitors have already announced services. It’s an issue AT&T couldn’t ignore.”

Bob Rosenberg
President
Insight Research Corp.
Parsippany, N.J.

Vitalink's LAN interconnect family

Expanded product line resulting from Network Systems Corp. and Vitalink's merger:

Multiprotocol bridge/routers			SNA internetworking products
5000 Series	6000 Series	8000 Series	4000 Series
• TransLAN	• 6600	• 8800	• SDLC Server
• TransRING	• 6400		• SNA Gateway
• TransPATH	• 6800		
Vitalink's original product line	NSC's original products	OEM from Coral Network Corp.	OEM from Netlink, Inc.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: VITALINK COMMUNICATIONS CORP., FREMONT, CALIF.

Vitalink merger enables firm to bolster product mix

Recent deals result in new routers, SNA support.

By Maureen Molloy
Staff Writer

FREMONT, Calif. — In little more than four months, Vitalink Communications Corp. has shored up some gaping holes in its product line, positioning itself as a stronger contender in the LAN internetworking market.

Following its merger this past July with Minneapolis-based Network Systems Corp., as well as two recent reseller agreements, Vitalink broadened its horizons from providing a single-technology remote bridge line to supplying bridges, multiprotocol routers and IBM Systems Network Architecture connectivity products.

The merged product line, called the Enterprise Networking Processor Family, incorporates Vitalink's existing 5000 Series line of remote bridges as well as Network Systems' Series 6000 Reduced Instruction Set Computer-based multiprotocol bridge/routers.

It will also consist of a high-end backbone router that Vitalink has agreed to resell from Marlboro, Mass.-based Coral Network Corp. as well as SNA server and gateway products from Raleigh, N.C.-based Netlink, Inc. (see graphic, this page).

Vitalink will be responsible for developing and marketing the internetworking products of both companies.

To achieve common network management for all the products, Vitalink will deliver standards-based net management software that can be used to control multi-vendor internetworking equipment from a central workstation.

Vitalink's Open Management System will run on a Sun Microsystems, Inc. SPARCstation and support SunNet Manager software as well as the Simple Network Management Protocol.

In addition, serial line interfaces provided by a common carrier will enable the disparate products from the two companies — such as Vitalink's bridges and Network Systems' routers — to interoperate. These interfaces include devices for Point-to-Point Protocol transmission at speeds up to T-3, as well as devices for frame relay services.

The network management products and serial interfaces will be available next month.

The two products that Vitalink will resell from Netlink will enable users to integrate SNA traffic onto an internetwork backbone.

The first product, SDLC Server, will allow users to attach Syn-

(continued on page 10)

Industry frets over boom in E-mail APIs

Users, vendors express confusion over which API to support, fear API glut could delay applications.

By Bob Brown
Senior Editor

NEW ORLEANS — Users and vendors at a recent electronic mail conference here said they are concerned that the spate of application program interfaces (API) emerging to link applications to E-mail systems will thwart attempts to ensure software interoperability.

At the Electronic Messaging '91 conference, application developers, including users and vendors, said they are confused about which API or APIs to support. With developers going their separate ways, users are concerned about whether the applications they develop or buy will work with their existing or future E-mail systems.

Lotus Development Corp.'s recently announced Open Messaging Interface, Microsoft Corp.'s Microsoft Mail API for Windows and existing mail APIs within Novell, Inc.'s Message Handling Service and from the X.400 API Association are designed to simplify development of E-mail applications.

But the emergence of multiple APIs rather than a single stan-

dard API could have just the opposite effect by delaying application development, according to attendees at the conference, which was sponsored by the Electronic Mail Association.

“I’m concerned that we’re headed for an API war,” said Pete Donaghy, manager of customer services and the support laboratory at Hughes Aircraft Co. in Long Beach, Calif. “Now there’s [the Open Messaging Interface, Microsoft’s Mail Application Programming Interface] and the rest, and I don’t know what we’re supposed to do, given we have a mixed-vendor environment.”

Sorting out the API choices will be critical for users in plotting E-mail application development and host-to-local-area network E-mail migration strategies, said Nick Dixon, E-mail worldwide product manager for the IBM Information Network at IBM.

“This is the single biggest challenge users have in moving to LAN-based E-mail systems,” Dixon said. The lack of a standard API could mean less functionality in linking host- and LAN-based E-mail systems, he added.

(continued on page 10)

People & Positions

Windata, Inc., a Northborough, Mass., maker of wireless local-area networks, last week named **Wallace Smith** the company's president and chief operating officer.

Smith will run day-to-day operations at Windata, as well as oversee marketing and distribution relationships.

Previously, **Greg Hopkins**, Windata's chairman and chief executive officer, was acting president.

Smith formerly was vice-president of marketing and sales for Stardent Computer.

Ron Ponder last week was named to the newly created position of executive vice-president and chief information officer at United Telecommunications, Inc., the parent company of US Sprint Communications Co.

Ponder will be responsible for software systems design and implementation, as well as all data center operations and internal data-processing systems at United Telecom and US Sprint. He will report directly to **William Esrey**, United Telecom chairman and chief executive officer.

Previously, Ponder was senior vice-president of the information and telecommunications division of Federal Express Corp.

(continued on page 10)

“Vitalink benefits with greatly expanded distribution channels and engineering staff.”

▲▲▲

“The Network Systems/Vitalink merger is an ideal fit and fills the missing gaps in each company's respective product line,” said Michael Howard, president of Infonetics Research, Inc., a San Jose, Calif., consultancy. “Vitalink benefits not only with an expanded product line, but with greatly expanded distribution channels and engineering staff.”

The merger will provide interoperability between Vitalink's and Network Systems' product lines, as well as common network management capabilities for the new Vitalink bridges and routers. All products can work with one another, and all can be managed via a Simple Network Management Protocol manager.

INDUSTRY BRIEFS

ComputerLand to sell SynOptics gear. SynOptics Communications, Inc., a Santa Clara, Calif., wiring hub maker, last week said it has signed a reseller agreement with ComputerLand Corp., a Pleasanton, Calif., reseller.

ComputerLand will distribute SynOptics' full line of Ethernet, token-ring and Fiber Distributed Data Interface products. The agreement is designed to expand SynOptics' reach in the work group and departmental network markets while boosting ComputerLand's presence in the network market in general.

Bull unveils systems integration unit. Groupe Bull in North America last week announced a new systems integration unit for helping users migrate proprietary networks to open computing environments. The new unit, dubbed Integris, will be separate from the parent and vendor-neutral in making technology decisions, according to Stephen Gardner, president of Integris, based in Billerica, Mass.

Among the company's specialties will be integration of Novell, Inc. NetWare and Microsoft Corp. LAN Manager local-area networks with enterprise nets, off-loading IBM mainframe applications, imaging, client/server computing, and net design and analysis. The firm also claims to have expertise in implementing the Open Software Foundation, Inc.'s Distributed Computing Environment and Distributed Management Environment technologies. Integris has established relationships with Novell, Microsoft, 3Com Corp. and Ingres Corp.

(continued on page 10)

Vitalink merger to bolster product mix

continued from page 9

chronous Data Link Control devices to token-ring or Ethernet local-area networks. That, in turn, lets SDLC devices, such as IBM cluster controllers, connect to an IBM host via the same bridge/routers that support users' multiprotocol LAN traffic. The SDLC Server does this by stripping off the SDLC header and attaching an IEEE 802.2-compatible Logical Link Control header.

Each SDLC Server can connect as many as 16 SDLC lines and up to 60 SDLC devices to a token-ring or Ethernet LAN. It also provides support for IBM's NetView and incorporates an SNA Physical Unit to send alerts and statistics to NetView.

The SDLC Server will be available next month. Pricing starts at \$6,600.

The new product strategy will be rounded out with the addition of a Series 8000 RISC-based high-end router that Vitalink will resell from Coral Network Corp. The router will be equipped with an 800M bit/

sec VME bus and support T-3 wide-area network interfaces.

The product is currently in beta test and will be available in early 1992. Pricing will range between \$40,000 and \$80,000, depending on configuration.

The other offering, called SNA Gateway, is software that will enable terminals supporting Digital Equipment Corp.'s Local Area Transport (LAT) protocol to appear as 3270 devices to an IBM host. This eliminates the need for multiple devices and networks by allowing LAT devices to access both DEC and IBM systems.

SNA Gateway can be connected to the host via a wide-area SDLC link or, when connected to an Ethernet or token-ring LAN, via a bridged connection similar to the SDLC Link Server.

From a single LAT connection, end users can access as many as five SNA sessions. In its base configuration, the device supports 16 SNA sessions and can be upgraded to support 128 SNA sessions.

The SNA Gateway will be available early next year. Pricing has not been set. **□**

Industry Briefs

continued from page 9

3Com makes it in Ireland. 3Com Corp., a Santa Clara, Calif., maker of network adapters and internetworking equipment, last week said it has begun construction of its first manufacturing facility to serve the European market.

3Com plans to invest more than \$16 million in the Blanchardstown, Ireland, facility, which will initially produce Ethernet network adapters and will have the potential to manufacture internetworking products down the road.

3Com officials said having a manufacturing plant in Ireland will improve product availability across Europe.

IBM, McCaw ink pact. IBM and McCaw Cellular Communications, Inc. recently announced a joint marketing agreement under which McCaw will provide cel-

lular service for users purchasing IBM's recently announced PCradio product, which will be available later this year.

The IBM PCradio is a notebook computer that allows the user to access IBM hosts from remote sites.

Digital Access gets financing. Digital Access, Inc., a Reston, Va., network equipment maker, recently announced the completion of a second round of financing valued at more than \$6.5 million. The money will be used for market development, business expansion and operating capital.

The company garnered \$1.5 million in its initial round of financing to fund research and development.

Digital Access markets a line of Fractional products that enable users to dial up bandwidth on demand to support the transmission of images, video and other network traffic. **□**

Industry frets over boom in E-mail APIs

continued from page 9

Another major drawback of having too many APIs could be that application development will be slowed, Dixon said.

"It would act as an inhibitor to the development of automation, EDI and other E-mail applications that want to sit atop the API," he said.

Delivering an API that all developers could write to was the point of the X.400 API Association, a group formed by more than 20 E-mail vendors in 1989 to deliver a standard set of mail APIs, Donaghy said. A common API would enable application developers to write to one API rather than multiple E-mail systems, he said.

But some observers said specifications such as OMI might stand a better chance than the X.400 API Association's API because they are not tied to X.400.

"The reason the X.400 API [Association's] API never took off is that most companies do not have X.400 backbones," said Dipak Shah, an analyst at Eli Lilly & Co.

According to Nina Burns, president of consulting firm Network Marketing Solutions, Inc., the emergence of OMI and MAPI was nearly inevitable.

"There is a long lag time between standards and products," Burns said. "There is always going to be that lag time, and there is always going to be pressing user needs between when standards can address those needs and when vendors can deliver products."

APIs such as OMI and MAPI will provide application developers with something they can write to immediately, Burns said.

"Writing to a few different APIs is still better than writing to every mail system," she said.

Philippe Courtot, the vice-president responsible for Lotus' cc:Mail subsidiary, defended OMI by emphasizing that it "is not Lotus Notes-centric," but includes input from multiple sources. Lotus has forged ahead with OMI rather than supporting the X.400 API Association specifications because the X.400 API Association process has taken too long, the group's work has not been completed and few other vendors have supported its specifications in products, he said.

"We just could not wait," he added.

Still, during a user and vendor panel discussion at the conference, Chuck Digate, president of Beyond, Inc., an E-mail software start-up based in Cambridge, Mass., called on Lotus "to retract OMI and start over."

Digate did not say the X.400 API Association's specifications are the answer. But he did urge Lotus, whose OMI specification has been endorsed by Apple Computer, Inc., IBM, Microsoft and other vendors, to work together to develop an API "that is truly an industry standard."

"As soon as they do that, we'll sign up," Digate added.

Mike Zisman, president of Soft-Switch, Inc., an E-mail gateway software maker, stopped short of calling for Lotus to abandon OMI but said vendors backing the various APIs must make clear to users what they are offering. Given that the X.400 API Association's API has not caught on more than two years after being delivered, Zisman said he doesn't see why Lotus or



Chuck Digate

Microsoft believe their APIs will be accepted by users.

"This is very complex and confusing," said Zisman, whose company issued a white paper on APIs at the conference.

"The idea of having a common API for applications to call on mail services is a good idea," according to the Soft-Switch white paper. "It was a good idea in 1989 when the X.400 API [Association] defined one that no one implemented. It's a good idea today. But it is unlikely that any API that does not also provide an open downstream interface will be successful."

The bottom line, according to users, is to have a standard set of APIs.

According to Patrick O'Connor, information systems consultant at Liberty Mutual Insurance Group, "Our experience is that stable, well-defined, easy-to-use and well-documented APIs mean more and better mail-enabled applications." **□**

People & Positions

continued from page 9

Lotus Development Corp. last week named **Ed Owens** to the newly created position of director of work group applications and connectivity products for cc:Mail, Lotus' local-area network-based electronic mail system.

Owens will be responsible for the software design and development of future cc:Mail connectivity products, and will also influence design of Lotus Notes.

Previously, Owens was vice-president of development for The Higgins Group.

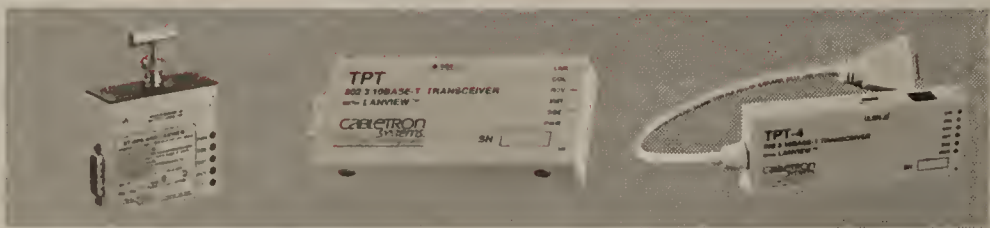
Priscella Lu, formerly director of AT&T's imaging business unit, last week was named vice-president and general manager of Network Equipment Technologies, Inc.'s Network Systems Division.

Lu will be responsible for the design and manufacturing of NET's IDNX communications resource manager product line, including the development of new IDNX communications capabilities. Lu will report to **Steven Markman**, senior vice-president and general manager of the Network Systems Group.

David Langlais last week was promoted from director of product marketing to the newly created position of vice-president of marketing at The Wollongong Group, Inc.

Langlais' marketing functions will include channel marketing and technical sales support. He will also be responsible for systems engineering and marketing communications. He will report to **Herbert Martin**, Wollongong president and chief operating officer. **□**

ETHERNET COAX TRANSCEIVERS 10BASE-T TRANSCEIVERS



COAX TRANSCEIVERS ST-500

- ▶ Supports Thick and Thin Coax Cable
- ▶ Fully 802.3 Compliant
- ▶ LANVIEW Diagnostic LEDs
- ▶ Selectable SQE
- ▶ Industry's Most Popular Transceiver - Over 500,000 Installed

10BASE-T TRANSCEIVERS TPT, TPT4

- ▶ Fully 802.3 10BASE-T Compliant
- ▶ LANVIEW Diagnostic LEDs
- ▶ Selectable SQE
- ▶ Includes Polarity Detection and Correction
- ▶ Optional Built-in AUI Cable

*Designed by the World's
Largest Transceiver Manufacturer*

Cabletron
systems
The Complete Networking Solution

**24 HOUR DELIVERY
DIRECT FROM MANUFACTURER**

35 Industrial Way, P.O. Box 5005, Rochester, New Hampshire 03867-5005
603-332-9400 Fax 603-332-4616

TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

AT&T last week said it has gradually reduced the number of trouble tickets opened per year from 3 million in 1989 to less than 1½ million so far this year.

AT&T earmarks \$3b for 1992 network upgrades

Plans to add fiber and new switching system.

By Bob Wallace
Senior Editor

NEW YORK — A top AT&T official last week said the carrier will spend approximately \$3 billion next year to improve and expand the reach of its global net.

John Petrillo, vice-president of strategic planning for AT&T's Communications Services Group, said AT&T will add more fiber and high-speed switching equipment to its network.

"We have spent \$20 billion over the last eight years on the network and will spend an additional \$3 billion next year," Petrillo said. "Although we will invest some of that in employee training and education, the bulk will be spent on the network."

AT&T's top priority is adding fiber to its U.S. network. "We need more fiber," Petrillo said. "Economics and sound quality have made fiber the transmission technology of choice for us."

AT&T had installed 31,400 fiber route miles in its 62,500 route-mile domestic network as

of the end of last year, according to an AT&T spokesman. He declined to say exactly how much fiber will be added by the end of this year and in 1992.

AT&T's domestic network is composed of fiber and coaxial cable as well as digital microwave in rough terrain. The carrier uses satellite facilities and undersea fiber cable to handle international traffic.

The carrier's next priority is to invest in efforts that will help minimize or more flexibly deal with the fiber cuts and switch outages that have periodically paralyzed the network. This includes establishing redundant routes.

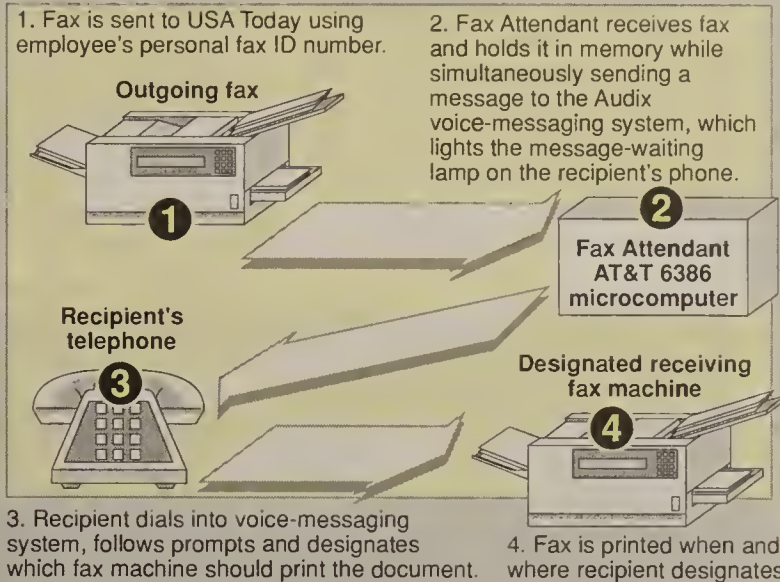
"The network problems are embarrassing," Petrillo said. "We are taking immediate action to address the problems."

One of the steps is to upgrade, replace or augment power systems in AT&T 4ESS and Digital Access Cross-Connect System (DACS) centers throughout the U.S. AT&T will spend \$200 mil-

(continued on page 12)

USA Today trials AT&T fax, voice-messaging product

Fax Attendant/Audix combination enables USA Today to better manage incoming faxes



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: USA TODAY, SILVER SPRING, MD.

Newspaper trials mix of net technologies

USA Today uses ISDN, fax and voice processing to bolster services to subscribers and advertisers.

By Joanne Cummings
Staff Writer

SILVER SPRING, Md. — *USA Today*, a subsidiary of Gannett Company, Inc. based here, is trialing a mixture of ISDN, voice-messaging and facsimile technologies in an effort to improve customer service.

Gannett turned to the technologies to aid its launch of a new weekly baseball magazine, as well as to bolster subscriber and advertiser services for its flagship *USA Today* publication.

"With this setup, we're able to [handle customer inquiries for] *USA Baseball Weekly* without increasing our staff significantly," said Sandi Timmins, national customer service manager for *USA Today*. "And our overall customer service levels have significantly improved." The newspaper has also been able to add a variety of new applications to the network, including a reader survey.

"We've added applications and haven't even begun to tap the power of the net," said Michael Baccala, telecommunications analyst at the paper. "This is technology that should take us well into the year 2000."

Gannett decided to replace its old Rolm Co. private branch exchange with an AT&T Generic 1 switch that could keep up with the anticipated spurt of traffic generated by the publisher's launch of *USA Baseball Weekly*.

"Taking into account the cost of upgrading the Rolm system, we decided it would be more prudent

to look into newer technologies that could handle our needs well into the future," Baccala said.

In addition to the Generic 1 PBX, Gannett installed an AT&T 3B2 minicomputer and a voice response unit to support new automated customer service applications.

Now, the voice network is designed so the Generic 1 PBX fields all calls and passes off some traffic to the 3B2. The minicomputer uses integral software that extracts a call's automatic number identification and dialed number identification services (DNIS) data. It then passes it to the AT&T 6386 microcomputer-based voice response unit, which plays a message for the caller.

If *USA Today*, for instance, is aware of a problem in one of its printing plants that will delay distribution to a certain geographic area, it can set the voice response unit to play a message to callers from a particular area code indicating there is a problem and telling them when to expect delivery of the newspaper. If callers are seeking other types of information, the unit can prompt them to punch in the number of the department with which they wish to speak.

When the voice response unit is linked to a subscriber database on the company's IBM Application System/400 within the coming months, callers will also be able to access their own accounts to start or stop delivery of papers, (continued on page 12)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T awaits FCC verdict on Tariff 15. AT&T will have to wait until at least Friday to find out whether efforts to salvage Tariff 15 will work. In September, AT&T revised the general rules governing who can qualify for Tariff 15 in an effort to address concerns that have prompted the Federal Communications Commission to reject the deals as unlawful.

Tariff 15 allows AT&T to make discount offers to customers who have been wooed by rival carriers with similar off-tariff deals.

In August, the FCC ruled that Tariff 15 was discriminatory and, therefore, unlawful because only those who have received offers from other carriers can get Tariff 15 deals. The FCC also said the offerings are anticompetitive because AT&T doesn't beat the rival deals — only matches them.

In response, AT&T filed revised rules for its Tariff 15s, removing the language stating that the deals "respond to special discounts offered to specific customers." Instead, the tariff rules now say Tariff 15 is "designed to respond to competitive circumstances affecting specific customers." AT&T believes the new wording satisfies the FCC's concerns that the deals are discriminatory and anticompetitive. AT&T requested that the new rules take effect Nov. 4, but the FCC asked for more time to study the matter, prompting AT&T to push back the date to Nov. 29.

The carrier is also pursuing the matter in court. AT&T has requested that a federal appeals court hold up the FCC's order rejecting one Tariff 15 deal for Resorts Condominium International, Inc. It has also asked the court to review and overturn the FCC's order.

Few observers expect AT&T to be successful in its attempt to salvage Tariff 15. Last week, the FCC also was taking the final procedural steps to throw out 12 other Tariff 15 deals. ■

Carrier Watch

Pacific Bell last week announced that it has teamed with Southern California Edison Co. and several office products suppliers to sponsor what is being billed as California's largest telecommuting work center.

The Telecommuting Work-Center of Riverside County offers Inland Empire region residents an alternative to the three-hour round-trip commute to jobs in Orange and Los Angeles counties.

Commuter Transportation Services, Inc. estimates that a 250,000 residents from Inland Empire commute to the two counties, with most commuters traveling more than twice the national commuting average of 10 miles.

The 8,800-sq. ft. work center accommodates 55 telecommuters a day and provides all the amenities of a professional office so that employees can go to work without going to work. The work center features private and secure offices, cubicles, a conference room, Pacific Bell Centrex service and voice mail, secure data transmission service, and access to personal computers, modems and printers.

Four companies with offices in Orange and Los Angeles counties have already given employees the green light to work out of the center. TRW, Inc. of Orange is the largest participant with 25 Inland Empire residents signed up to telecommute. Fifteen Pacific Bell employees who typically work in Pasadena, Anaheim and Tustin offices have also committed to the project. IBM and Southern California Edison are expected to join. ■

Newspaper trials mix of net technologies

continued from page 11

all without the involvement of a *USA Today* representative. Callers will also be able to perform their own change of addresses simply by entering the information using their push-button phones.

The voice response unit has also enabled the newspaper to handle and compile the results of a reader survey published by another Gannett newspaper, *The Desert Sun* in Palm Beach, Calif. Each Monday, Wednesday and Friday, *The Desert Sun* publishes a question concerning a topical issue. It then offers its readers two 800 numbers, one to vote yes on the ques-

tion and one to vote no.

The 800 numbers are tied into the *USA Today* phone system and are accepted by the voice response unit. Software on the unit uses Integrated Services Digital Network's DNIS feature to tabulate the amount of ayes and nays, and it uses ANI to weed out calls from the same number, avoiding the possibility of ballot stuffing.

USA Today is able to tabulate the responses overnight and provide them to *The Desert Sun*, which can publish the results the next day.

USA Today is also working on using this application in conjunction with "The MacNeil/Lehrer Report," a Public Broadcasting System television program.

The network also has been redesigned

to enable *USA Today* to better manage fax traffic. A second AT&T 6386 microcomputer configured with AT&T Fax Attendant/Audix voice-messaging software is linked to the PBX. That unit is on loan from AT&T while the company trials the Fax Attendant/Audix software, *USA Today's* Baccala said.

The Fax Attendant/Audix part of the network has helped the newspaper's classified section streamline its operations.

Before the advent of Fax Attendant/Audix, each time an advertiser requested a copy of *USA Today's* five-page rate card, someone had to manually fax the card to the advertiser — a time-consuming process. Now, the newspaper has programmed the rate card into Fax Atten-

dant/Audix and published a direct-inward dial number so prospective advertisers can call the number and, following voice prompts, have the system transmit the rate card.

Fax Attendant/Audix also enables users to route their personal incoming faxes. Each *USA Today* employee is assigned a voice mailbox number for receiving voice mail messages and a fax mailbox number for receiving faxes. When a fax destined for a personal fax mailbox is received, it is stored in Fax Attendant/Audix and a message waiting lamp is lit on the employee's phone. The employee dials into the voice-messaging system and, following prompts, can have the fax routed to any fax machine. Thus, faxes no longer pile up in a tray until someone picks them up; they are all stored until the person designates where and when they should be printed.

This feature is also useful for employ-

Announcing the ComNet New Product Achievement Award Competition

ComNet Conference and Exposition — known in the industry as the forum for new product introductions — will introduce a New Product Achievement Award Competition at ComNet '92 to be held January 27-31 at the Washington Convention Center in Washington, D.C. This competition gives exhibiting companies the opportunity to gain worldwide recognition for their new products, enhancements and upgrades.

Rules of the contest . . .

Prior to ComNet '92, a panel of editors and reporters from leading trade publications will review entries submitted by vendors from ComNet's distinguished list of exhibitors. The panel will select ten products they believe will make the greatest overall contribution to the communications industry.

At the show, attendees will have the chance to view the ten products in a special New Product Showcase at the Washington Convention Center, evaluate their performance on the show floor, and vote for the five new products they think are the most innovative and worthy of commendation.

And by casting their ballot, attendees will also be eligible to win a variety of valuable, industry-related prizes — a complete list will be posted at the New Product Showcase.



And the winner is . . .

The five New Product Achievement Award finalists will be announced at a 2:00 p.m. press conference on Wednesday, January 29 and awarded special trophies during an Exhibitor Reception to be held later in the day.

How to enter . . .

For more information about submitting a product for review by the panel of judges, call Nancy Heleno at 703-739-9288. (Entry forms have already been mailed to all contracted ComNet '92 exhibitors with a deadline of December 6, 1991 for entering a product in the contest.)

For details on attending the ComNet '92 conference and exposition and casting the final vote, call 800-225-4698 and ask for a ComNet account representative.

COMNET 1992 NEW PRODUCT ACHIEVEMENT AWARD JUDGES: David Buerger, *Communications Week*; Bill Laberis, *Computerworld*; Lee Keough, *Data Communications*; Patricia Schnaidt, *LAN Magazine*; Mary Petrosky, *LAN Technology*; Susan Rastellini, *Networking Management*; John Dix, *Network World*; Paula Musich, *PC Week*; Tom Valovic, *Telecommunications*; and Andy Jenks, *Washington Technology*

Faxes are all stored until the person designates where and when they should be printed.



ees who are away from the home office. They can access their fax messages through the voice-messaging system and have the faxes sent to any fax machine they want, whether it be at a hotel or a remote office.

Together, the new applications and system are enabling the company to grow without having to add significantly to its staff.

"Right now, we're in constant growth mode," the paper's Timmins said. "As we grow, we'll simply be able to use our current staff to handle the increased volume, rather than hire people." □

AT&T earmarks \$3b for net upgrades

continued from page 11

lion over the next two years on this undertaking, the spokesman said.

AT&T is also banking on improvements in network routing to enable it to more quickly restore service after an outage. The carrier has invested an unspecified amount of money in the development and deployment in what it calls Fast Automatic Restoration (FASTAR).

FASTAR is a routing algorithm used to instruct T-3 DACS to reroute traffic carried by 45M bit/sec fiber-optic facilities around congested or failed facilities. Deployment of FASTAR, which will be completed soon, will enable the company to reroute up to 72 T-3s in seven minutes.

"What AT&T is doing as part of its spending is deploying capabilities like FASTAR — which have been trialed in portions of the network — throughout the network," said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy.

Petrillo said AT&T will continue replacing T-1 DACS throughout its net with more powerful T-3 DACS and added that such a move would help set the stage for the introduction of a switched T-3 service. □

The New Product Achievement Award Program

ComNet salutes the best new products of 1992.



ComNet is produced by World Expo Corp., an International Data Group Company, the world's leader in information services on information technology.
World Expo Corp., P.O. Box 9107, Framingham, MA 01701

NPA

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

“You don’t really manage objects with [Simple Network Management Protocol]. It’s more a matter of gathering information about the status of objects. There’s a capital ‘S’ in SNMP.”

Dan Simone
Network engineer
Motorola, Inc.
Communications product groups
Schaumburg, Ill.

Data Packets

Digital Equipment Corp. recently rolled out a suite of services for users of its BASEstar integration software for manufacturing environments. BASEstar is designed to distribute event-driven data collected from a variety of industrial control devices to manufacturing applications.

The new services address planning, design, installation and management of computer integrated manufacturing environments running BASEstar software.

Specifically, the offerings include BASEstar Evaluation Service, for determining BASEstar applicability in a customer’s CIM environment; BASEstar Consulting Service; BASEstar Onsite Training Service; BASEstar Startup Service, for initial installation and configuration; BASEstar Custom Integration Service, for integration of DEC and non-DEC devices and applications; and BASEstar Performance and Tuning Service, for ensuring optimal performance. BASEstar services are available now.

CompuServe, Inc. recently announced a multi-million-dollar, seven-year contract with TRW, Inc.’s Information Services Division to build and manage a dial-up network over which users can access credit reports from their mainframes. ■

DEC preps ACA software for IBM MVS mainframes

Pack lets VMS, Ultrix and MVS applications talk.

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. is close to releasing a version of its Application Control Architecture (ACA) Services software that will run on IBM MVS mainframes.

By putting ACA Services on IBM MVS mainframes, VMS and Ultrix applications can communicate with and incorporate data from applications on large IBM systems.

ACA Services, a component of DEC’s Network Applications Support (NAS) product suite, is an object-based program for integrating VMS and Ultrix applications in a mixed platform computing environment. With ACA Services, users running VMS and Ultrix applications developed by DEC or third parties can invoke the services of other VMS and Ultrix applications across a net.

The software currently runs on VAX/VMS and Ultrix workstations and servers.

“This is a significant design opportunity for us,” said John Clancy, ACA Services marketing manager at DEC. “We need a

quick solution for our customers. We’re hearing from our customers, ‘This is my existing asset base of applications. Support it.’”

Clancy said ACA Services for MVS will be useful for accounting and process manufacturing applications. He declined to say when ACA Services will be available for MVS systems, but Dennis Phelan, DEC’s NAS strategic marketing manager, said DEC will release “individual components” of NAS for MVS systems before 1993.

“This is not something that’s miles away,” said Frank Dzubeck, president of consultancy Communications Network Architects, Inc. in Washington, D.C.

For users with both MVS and VAX systems, ACA Services will enable them to deploy MVS systems as network servers, analysts said. “MVS is where the data is,” said Chris Christiansen of the Meta Group in Westport, Conn.

“This is a big shift for DEC,” said John Rymer, vice-president of Patricia Seybold’s Office Computing Group in Boston. “If they hope to play a role in the enterprise, they have to start putting their software on MVS.” ■

Device uses compression to monitor line status

By Jim Duffy
Senior Editor

SPRINGFIELD, Va. — Cornet, Inc. recently brought out a system that uses data compression techniques to collect data from remote wide-area net circuits.

The Remote Access Line Monitor (REALM) is a stand-alone unit that sits between line concentration equipment — such as a front-end processor or a multiplexer — and a modem, gathering information on line activity.

The REALM unit monitors connections between modems and terminals as well as between remote nodes at both sides of a line. REALM compresses the data and sends it across a 9.6K bit/sec or 56/64K bit/sec line to a master REALM monitor at a central site.

The master unit decompresses the data and presents it, including the connection status, to a any data line analyzer, such as those made by Hewlett-Packard Co.

REALM is intended to address shortcomings in other remote line monitors by sending a continuous data stream of line activity

to the central site monitor. Other monitors only provide sequential snapshots of a few thousand bytes of line activity, said Nat Kumar, Cornet’s president.

“REALM does real-time continuous monitoring of the line,” Kumar said. Snapshot techniques are hit-and-miss because a net-

“REALM does real-time continuous monitoring of the line,” Kumar said.

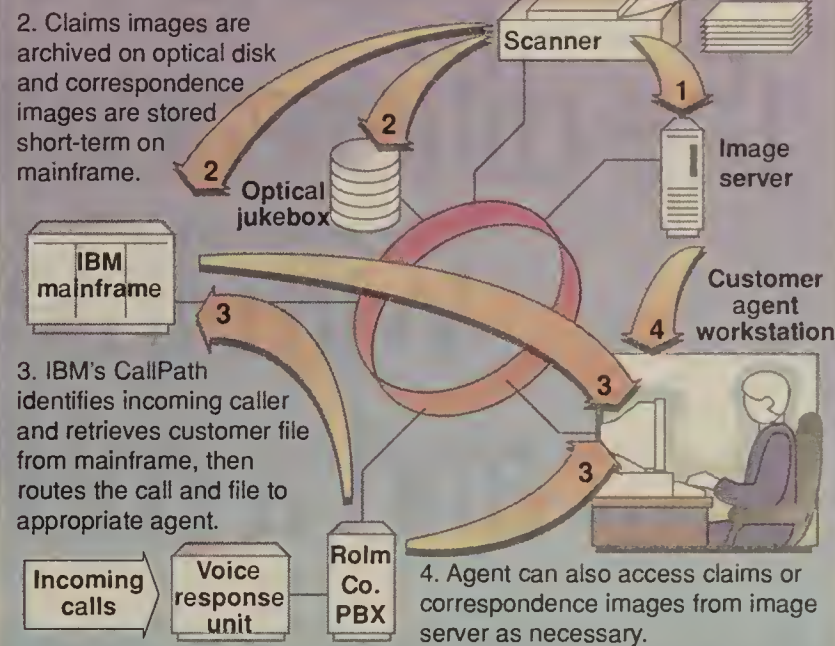
▲▲▲

work manager has to examine each byte sequence to discover where a fault occurred, he said.

Compression techniques allow REALM to monitor 56K bit/sec links over 9.6K bit/sec lines between remote units and the (continued on page 16)

Insurer recasts claims processing in its own image

1. Claims information and correspondence are scanned, then routed to appropriate departmental image server.



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: EMPIRE BLUE CROSS AND BLUE SHIELD, NEW YORK

Firm rebuilds claims, customer service nets

Client/server imaging net is giving firm an edge answering customer questions, processing claims.

By Joanne Cummings
Staff Writer

NEW YORK — Empire Blue Cross and Blue Shield is chalking up significant gains resulting from new imaging and voice response networks the company is installing to rebuild customer service and claims processing systems.

The client/server-based imaging net, which will be completed by year end, has enabled Empire to resolve 95% of all customer inquiries on the first call, a major improvement in the fiercely competitive health insurance market.

In addition, by installing automated voice systems to direct callers to informational databases or agents, the health insurer has lopped off 75% of the time a caller spends parked on hold.

Empire embarked on the project not so much to save money as to improve its responsiveness to customers.

“Customer service is basic to any kind of industry, but more specifically to the health insurance industry,” said Arlette Klein, vice-president of customer service at Empire. “This technology fulfills our requirements.”

There are several facets to Empire’s new network. The imaging side consists of image scanners, Personal System/2 workstations, Personal System/2-based image servers and optical disk jukeboxes tied together via an IBM Token-Ring network.

The local-area network-based imaging devices run software developed by Sigma Imaging Systems, Inc., a company in which Empire holds a majority interest, according to John Hollier, director of customer service technologies.

Under this setup, all of the company’s claims information and correspondence is routed directly from the mailroom to the scanners, where they are entered into the network.

Based on the type of account, the Sigma software routes the images to the correct department’s image servers. Copies of each image are archived on the optical jukeboxes, while images of customer correspondence are stored on an IBM mainframe linked to the Token-Ring LAN via a 3745 front-end processor.

Prior to the use of the imaging network, all claims information was kept in paper files and manually keyed into an IBM mainframe. The imaging net greatly reduces the chance of data input errors or loss of files, Hollier said.

Also, before the new network was implemented, the claims information was accessed by agents using 3270 dumb terminals linked to the IBM mainframe. The company’s new network is based on a client/server architecture, which enables the net to route information among the different (continued on page 16)

Everything you need to know about the difference between a Compaq PC with Intelligent Modularity and a merely upgradable PC.

These days, a lot of personal computers have upgradable processors and memory. But the new COMPAQ DESKPRO/M PCs have Intelligent Modularity, which goes far beyond ordinary upgradability. This unique design makes these PCs a smart investment for today and tomorrow.

Smart for today— designed for today's needs and today's budgets. Intelligent Modularity puts all vital subsystems on separate boards so you can choose just the performance and features you need.

Since the parts are interchangeable, the whole office can

Nobody else gives you all the advantages you get with the COMPAQ DESKPRO/M PCs.

	COMPAQ DESKPRO/M FAMILY	ALR BUSINESS VEISA	AST PREMIUM II	DELL POWERLINE DE	IBM PS/2 MODEL 90
1. Five-board modular design	Yes	No	No	No	No
2. Upgradable video without using an expansion slot	Yes	Yes	No	No	No
3. Separate I/O board for potential enhancements and ease of service	Yes	No	No	No	No
4. 14 levels of security including cable-lock provision	Yes	No	No	No	No
5. System configuration and ID number available in memory and accessible remotely	Yes	No	No	No	Yes
6. Power supply adequate for all expansion needs	240w	150w	145w	220w	194w

standardize on one platform. And since the parts are easy to access, they're easy and inexpensive to service. Replacement parts cost less, too.

Keeping track of what's inside each PC is easy with our built-in Asset Management provision. Each COMPAQ DESKPRO/M PC

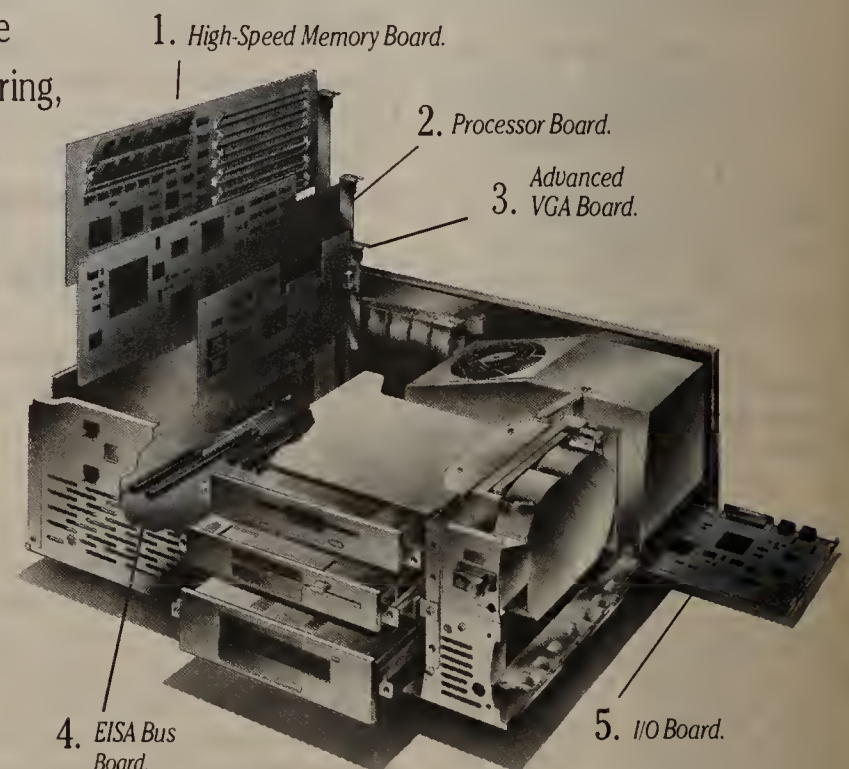
can tell you its serial number, how it's configured and what it has installed. Even remotely, over the network. A big time- and money-saver for MIS managers.

Smart for tomorrow—built to adapt to changing technology and changing needs. With Intelligent Modularity, upgrading and expanding only takes about five minutes. And, thanks

to unique

Compaq engineering, you get optimum performance no matter how you configure your system.

The 32-bit EISA expansion bus gets the most out of high-performance processors, expansion boards and peripherals. Superior



Intelligent Modularity—Five separate subsystems let you upgrade or replace only what you need.

thermals keep things cool, no matter how many options you add. And the 240-watt power supply can take anything you plug in.

Call your Authorized COMPAQ Computer Dealer and ask to see the wonders of the COMPAQ DESKPRO/M personal computers firsthand. Call 1-800-231-0900, Operator 185. In Canada, call 1-800-263-5868, Operator 185.

Everything the boss needs to know.



1. It's smart.
2. It's easy.
3. It's affordable.

COMPAQ

It simply works better.

Firm rebuilds claims, service nets

continued from page 13

work groups more efficiently, Hollier said.

"Like all insurers, we are very paper-intensive," said William O'Loughlin, director of customer service systems at Empire. "If we can have that paper made electronic, we can move it around faster and have it accessible to all those who need it."

The imaging network is linked to the company's Rolm Co. phone system via IBM's CallPath, which enables a customer call to be routed to a representative at the same time as the customer's account file.

Prior to the use of CallPath, a representative would have to put the customer on

hold while retrieving the account file, O'Loughlin said. In some cases, the agent would have to place an order for the file to be retrieved from microfilm. Now all that information is on-line, he said.

When a call comes into Empire's Rolm switch, it is answered by a voice response unit that prompts the caller to enter his identification number using a push-button phone. CallPath passes this information to the IBM mainframe, which accesses the customer's file and determines which representative should handle the call.

If the caller is 65 or older, for example, the call and the file would be routed to the customer service representative who specializes in that area.

By passing the customer's file and the

call simultaneously to the designated customer agent, CallPath saves time for both the customer and the agent because the call is routed to the correct agent every time and the customer does not have to wait while the agent finds the correct file.

"Roughly 17% of all our calls come into the wrong number" because many people call the company's main number rather than the specific department they need to reach, O'Loughlin said. "By using these applications, we're able to get those people to the right place immediately; 17% of calls into an area no longer need to be re-routed."

The agent can then instantly access from the image server all images of claims and correspondence pertaining to that

customer, speeding the resolution of the claim. "In most cases, it now takes just one phone call to fully answer a customer's inquiry," O'Loughlin said.

Empire is using voice response technology to completely automate customer inquiries. The company has installed three voice response units — one to handle the call-routing application, a second for claims status inquiries and a third for eligibility status inquiries.

The claims status application, called Empire Excel, enables an Empire subscriber to call into the company and check the status of a claim 24 hours a day, six days a week. The voice response unit prompts the customer for an ID number and then accesses the customer file from the mainframe.

Using in-house-developed software, the unit is able to tell the caller the status of the claim as well as whether a claim has been processed or denied. According to O'Loughlin, this application alone answers as many calls in a day as 10 customer service representatives.

The eligibility status application works in the same manner and is used by hospitals and health service providers to check whether patients are subscribers. This service, called Empire Fast Check, is available around the clock seven days a week. It is especially valuable when patients are admitted to a hospital emergency room.

"It enables the hospital to be assured right up front that it's one of our subscribers and they're covered," O'Loughlin said. He estimated that this application answers about 8,000 calls per day.

Prior to this application, service providers had to call Empire agents during regular business hours for this information. O'Loughlin said that providing this service around the clock using customer service agents would be extremely cost-prohibitive.

All in all, Empire is pleased with the results of its new network. "Our productivity is the thing to consider," Klein said. "The basic requirement [of the network] was to service customers accurately, courteously and quickly in order to diminish the amount of inquiries we would get. From that perspective, improvement in servicing our customers is assured." ■

Device monitors line status

continued from page 13

central REALM monitor, he said.

"Bringing data to a central site could not be done without compression techniques," Kumar said. "Compression is the key to making this concept happen."

REALM does not require net managers to know what protocol is used at the remote site for data collection and transfer. The system supports synchronous protocols, such as X.25, Systems Network Architecture/Synchronous Data Link Control, Binary Synchronous Communications and the Digital Data Communications Message Protocol, as well as asynchronous protocols. The modem interface for REALM is either RS-232C/V.24 or V.35. The units can be connected to any modem, time-division multiplexer or data service unit/channel service unit.

REALM is priced at \$6,000 for central and remote site monitors, or \$3,500 for a single remote site and \$2,500 for a single central site monitor. REALM is available 30 days after receipt of order. ■



A Union of Networking Leadership

Network World
announces its exclusive co-sponsorship of
Communication Networks East and West '92
(ComNet '92).

Network World's co-sponsorship of ComNet '92 unites two networking leaders in their respective fields — *Network World*, the award-winning networking newsweekly, and ComNet, the largest and most successful networking show in the country. This union makes for a winning combination sure to bring more networking executives to ComNet '92 than ever before.

Last February, attendees of ComNet '91 voted *Network World* their most regularly read publication from more than 200 other industry publications. This was the fourth consecutive year ComNet attendees voted *Network World* their first choice among other networking publications.

Make sure your networking products and services make the right connections at ComNet East '92. Advertise in *Network World's* January 27th show issue, ad close January 15th. Call your *Network World* representative at 800-622-1108 or David Rockey at Atwood Convention Publishing at 913-469-1110 to advertise in the ComNet Daily News.

NETWORK WORLD

Network World/ComNet Issue
Advertisers (1-27-92) Get
10% Off Their Ad in the
ComNet Daily News!

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

“Only object technology holds the realistic promise of enabling organizations to meet today’s software productivity challenge and to capture the power of the distributed, heterogeneous computing environment.”

Frank Ingari
President and chief executive officer
Ontos, Inc.
Burlington, Mass.

Interlink offers TCP/IP, NFS wares for LAN micros

Offerings work with firm’s host access products.

By Timothy O’Brien
West Coast Bureau Chief

FREMONT, Calif. — Interlink Computer Sciences, Inc. last week announced PCaccess and NFS for PCaccess, software products that enable microcomputers to support the Transmission Control Protocol/Internet Protocol and Network File System (NFS).

With its new products, Interlink now gives personal computer users industry-standard TCP/IP network capabilities and, at the same time, provides broad host access through compatibility with its IBM MVS mainframe-to-TCP/IP products.

“For Fortune 500 customers, we now have a way to attach LANs and provide access to the large file volumes on the mainframe,” said Patrick Johnston, director of of Interlink’s Application Systems Group.

Since its inception nine years ago, Interlink has primarily developed products that enable users of IBM S/370 mainframes, typically in an IBM Systems Network Architecture environment, to exchange files, send messages and share resources with computers on TCP/IP, NFS and Digital Equipment Corp. DECnet networks.

These products are grouped in the Software Network Solution (SNS) family and include mainframe products such as SNS/TCPaccess and SNS/NFS.

Johnston maintains that the company’s new TCP/IP protocol suite for PCs offers one of the highest performing file-transfer rates in the industry yet requires minimal memory overhead at the desktop.

Using as few as 30K bytes of
(continued on page 18)

Firm to unveil security pack for AppleTalk routers

By Caryn Gillooly
Senior Editor

BOULDER, Colo. — Compatible Systems Corp. this week is expected to unveil security software for its EtherRoute line of Apple Computer, Inc. AppleTalk routers that implements password security to block Apple Macintosh client access to specific network services and devices.

With the software, local-area network administrators can restrict access to certain devices and provide LAN services only to those users who invoke the correct password. According to Compatible Systems, there is no other product currently available that can limit Macintosh device access on a per-node basis.

“In one of our customer sites, which is a high school, students were printing out nasty notes on the principal’s laser printer,” said Matt McConnell, president of Compatible Systems, based here. “File servers have password protection, but printers don’t.”

According to McConnell, the new features will be embodied in a security protocol that the company developed called Enhanced Network Security. The protocol will reside in software on the company’s existing EtherRoute and EtherRoute/TCP Macintosh routers. EtherRoute routes AppleTalk traffic, while Ether-

Route/TCP supports AppleTalk and Transmission Control Protocol/Internet Protocol traffic.

Supporting software will also reside on each client given access to a particular device or service. “You don’t need to put this on all Macintoshes, just on those that will access devices that need to be protected,” McConnell said.

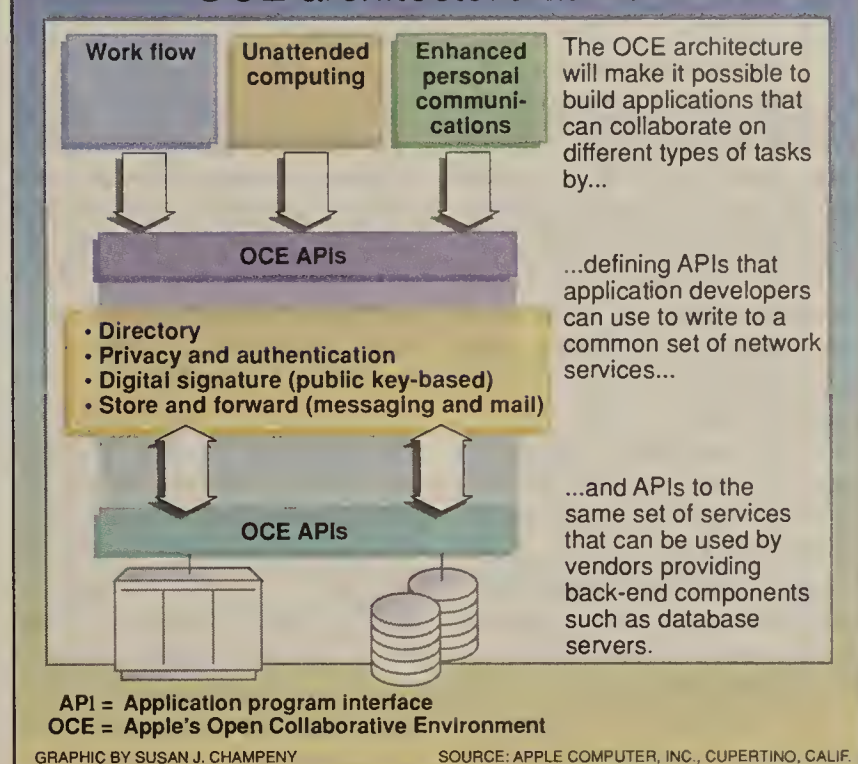
When a user sends a print job across the router to another network segment, for instance, the router-based software will request a password from the client before giving it access to the device. The software on the Macintosh client will automatically respond, providing the password if access is to be granted.

“This lets you password-protect virtually any individual device on the net,” McConnell said.

In addition, he said, it prevents users from accidentally printing onto expensive film printers, for example, where each page can cost \$10. It can also prevent users from dialing out on network modems they should not be using.

The protocol and client software will be included in all EtherRoute and EtherRoute/TCP releases. Despite the increased functionality, EtherRoute and EtherRoute/TCP prices will remain the same at \$1,495 and \$1,895, respectively. ■

OCE architecture at work



Apple architecture to spur cooperation

Open Collaboration Environment would enable applications to participate in problem solving.

By Caryn Gillooly
Senior Editor

Apple Computer, Inc.’s recently announced Open Collaboration Environment (OCE) is expected to encourage vendors to develop applications that can collaborate with other OCE-compliant programs to solve a range of business problems.

The pieces of the OCE architecture, which was unveiled at NetWorld 91 in Dallas last month, should be in place within about 2½ years, according to Gursharan Sidhu, technical director of collaborative systems and development at Apple in Cupertino, Calif.

When complete, the architecture will consist of a set of both front- and back-end application program interfaces (API) that vendors can use to write to a common set of network services, facilitating the creation of programs designed to work together in net environments.

Front-end APIs will let developers build applications that interact with the end user, generating requests to servers or databases, and displaying and manipulating information. Back-end APIs will be used by vendors of products that will process those requests, such as companies offering database management systems.

Both sets of APIs will provide access to existing network services, such as directory services, that will either be provided by Apple or are industry-standard,

such as the X.400 electronic mail transport standard.

Third-party developers and Apple itself will build applications using the OCE APIs, meaning programs will be able to use the same set of network services and work with other applications developed for OCE.

Real-life examples

According to Sidhu, because completion of OCE is still so far off and because technology changes so quickly, it is difficult to give specific examples of what type of applications OCE could lead to. “We aren’t able to imagine all the things we could do with this,” he said.

He did, however, give two examples of the types of collaboration that Apple anticipates OCE will bring.

The first example is what is known today as work flow. Through today’s work flow applications, electronic documents can automatically be forwarded from one person to another within a work group, avoiding the delay that occurs when documents are passed manually.

With OCE, instead of having to implement a single work flow application that can support only a limited number of business documents, customers will be able to build complete work flow environments consisting of several applications built to the OCE APIs.

For example, at one site, a cus-
(continued on page 18)

Netnotes

Microsoft Corp. recently rolled out seven electronic mail gateways that will let users of its Microsoft Mail for PC networks package communicate with users of other E-mail products.

The gateways give users access to IBM’s Professional Office System (PROFS), facsimile, X.400, Simple Mail Transfer Protocol (SMTP)/Unix, Novell, Inc.’s Message Handling Service (MHS), MCI Communications Corp.’s MCI Mail and IBM’s Systems Network Architecture Distribution Services (SNADS) environments.

According to Microsoft, the fax gateway is the one most requested by users. This gateway lets a Microsoft Mail user send a fax as if sending an E-mail message.

The other primary gateway is the one that connects to IBM PROFS environments. That gateway supports mail exchange with IBM PROFS systems, Office Vision/VM and CMS Notes.

The IBM PROFS gateway costs \$4,995, the fax gateway is priced at \$1,995, the X.400 gateway costs \$4,995, the SMTP/Unix gateway costs \$4,995, the MHS gateway sells for \$995, the MCI Mail gateway costs \$995, and the IBM SNADS gateway is priced at \$995. All products are available now. ■

Ungermann-Bass provides insight into future strategy

Focus on hubs, partnerships, integration services.

By Timothy O'Brien
West Coast Bureau Chief

BURLINGAME, Calif. — At its 14th Semi-Annual User Group meeting here last week, Ungermann-Bass, Inc. said it will focus its future efforts on expanding the functionality of its network hub, forming new partnerships and expanding its network integration services.

To keep pace in the fast growing enterprise network market, the company will work to increase the functionality of its Access/One hub line and partner with other companies for certain technologies instead of investing development resources.

"Our strategy from now on will be to build partnerships so we can provide for users the enterprise network infrastructure," said Ralph Ungermann, president and chief executive officer of Ungermann-Bass. "That way we can focus on what we do best."

Ungermann pointed out that the company recently signed up Advanced Computer Communications to provide router technology and also signed a technical support agreement with Novell, Inc. In addition, Ungermann-Bass continues to act as an OEM for Microsoft Corp.'s LAN Manager. He said there will be more partnership announcements as that strategy develops.

In his keynote address, Ungermann divided the local-area network market into two areas. The enterprise segment, growing at a rate of 30% to 40%, is primarily concerned with building corporate network infrastructure. The work group area, growing at 10% to 15%, is more concerned with ease of use and cost issues.

Acknowledging that Ungermann-Bass had lost some ground and seen growth flatten by trying to straddle both areas, he said the company would be reaffirming its commitment to the high end of the market in terms of its product

focus strategy and services offerings.

In order to better position the company to expand its existing network integration services and bring products to market faster, Ungermann has reorganized company management and given more control and decision-making authority to its business units.

As a result, Ungermann-Bass managers will be free to build partnerships and utilize third-party products to increase systems integration business around the world.

"We're not going to become an [Electronic Data Systems

"Instead of paying IBM to support your glasshouse, you now have to pay your network vendor,"
Parcell said.

▲▲▲

Corp.] or even supply computers," said Ungermann. "Our integration services will stay focused just on the network, working with customers on their global network strategies."

On the product side, Ungermann outlined recent innovations in the Access/One hub line, including activation of the Plus-Bus high-speed switching architecture, multiprocessor Reduced Instruction Set Computer-based performance, and a new open backplane architecture, which supports a broad range of standard network, application and computer interfaces. These enhancements were necessary, he claimed, to support emerging multimedia applications.

According to Ungermann, every Access/One hub since 1988 has been equipped with the Plus-Bus backplane, although earlier versions of the hub could not take advantage of the bus.

Now Ungermann-Bass has unlocked that capability, meaning users can migrate to next-generation features without replacing equipment.

"We're moving to FDDI faster than we thought we would," said Greg Parcell, supervisor of network technology at the Chicago Board of Trade. "With the Access/One products, we don't have to go buy new hubs."

In terms of software, users at the conference called on Ungermann-Bass to move faster in adopting new client/server technologies and standards, especially when it came to supporting Microsoft Windows and current versions of LAN Manager. Ungermann-Bass assured users that it would provide its value-added LAN Manager enhancements and other network drivers in a more timely manner.

Other areas that users discussed were network management and technical support.

Although many companies are centralizing management of departmental networks, users said the cost of support services and the need for better network management tools are still issues of concern.

In fact, as centralized control of networks becomes more prevalent, companies are looking at network reliability and evaluating alternatives on how to manage and pay for network support companywide. While network equipment purchases can still be justified to management, users said support services are a more difficult sell.

Nonetheless, Parcell said large LAN internetworks are as great a support burden as mainframes and that network support is necessary.

"Management has had a view that networks require lower maintenance than mainframes. That's not so," he said. "Instead of paying IBM to support your glasshouse, you now have to pay your network vendor." ■

cess via a modem, along with VT-220 and IBM 3270 terminal emulation through Telnet.

In the area of printing, PCaccess supports Internet-standard utilities for printing across the network. As a result, DOS files can be printed on Unix- or host-based printers while mainframe files can be printed on local-area network-based printers.

NFS for PCaccess, an add-on product to PCaccess, allows LAN users to transparently access files from any TCP/IP LAN-attached system implementing NFS and is compatible with IBM mainframes running Interlink's own SNS/NFS product.

To ensure data integrity in applications, the NFS product supports DOS 3.1 file locking and sharing, and maintains all Unix file protections.

NFS for PCaccess allows attachments of as many as 24 remote file systems — the PC limit — and support for up to eight simultaneous sessions.

NFS for PCaccess uses 56K bytes of RAM and may be removed from memory when not in use.

PCaccess is priced at \$349 per PC and \$428 per PC if purchased with NFS for PCaccess. Both products are currently available. ■

Xerox opens up part of GlobalView

By Caryn Gillooly
Senior Editor

PALO ALTO, Calif. — Xerox Corp. last week announced a product that will enable customers of its proprietary GlobalView network environment to use industry-standard Intel Corp. 80386- and 80486-based microcomputers as server platforms.

The product, dubbed Xerox Services/PC, includes an Industry Standard Architecture coprocessor board and software for personal computers running The Santa Cruz Operation, Inc.'s SCO Unix.

The software will provide directory services and electronic mail, as well as file, print and communications services to attached workstations running Xerox's GlobalView applications.

GlobalView is Xerox's proprietary network environment that includes its own network operating system, network applications and services, and a graphical user interface. It also includes the company's Xerox Network Systems transport protocol.

Prior to this release, Xerox's network services were only available on proprietary Xerox servers running XNS.

"We are currently taking steps to bring all our applications to open systems," said Dan Patton,

product marketing manager at XSoft, located here. He pointed out that this is the third step toward that goal and the first step toward moving the server to a more open platform.

According to Patton, the first step took place last year with the introduction of a basic set of the company's GlobalView document and productivity applications on nonproprietary, Unix-based clients. The second step was this summer's announcement of Xerox's more advanced client/server applications on Unix-based clients.

No proprietary hardware

"This [announcement] will let us provide both client and server applications without requiring Xerox proprietary hardware," Patton said. "For the user, this means two things. First, it means the user can get these services on current, state-of-the-art hardware platforms. Second, from an organization point of view, it means that if users are running GlobalView and they want to expand, they no longer have to invest in a proprietary platform."

While this is only the first release of the product on a nonproprietary platform, the company plans to release a version next year that will run on scalable processor architecture-based servers, Patton said.

Xerox Services/PC is available now for \$3,100. The basic package includes the base services software, directory services and coprocessor board. File, mail, communications and print services are sold separately. ■

Architecture to spur cooperation

continued from page 17

tomers may be using a work flow application similar to those offered today to forward documents for authorization.

Using the OCE architecture, that application could work in conjunction with another application designed to process the forms once all the appropriate authorizations have been given. And the user may have implemented another OCE-based application that would then be responsible for entering the data into the corporate database.

According to Sidhu, one of the benefits of this particular scenario would be reduced costs. "Our customers tell us that it costs between \$50 and \$60 to handle one document," Sidhu said. "We need ways to lower that price — not just ways to get rid of the paper, but something electronic that will increase productivity."

Another example Sidhu gave was for unattended computing. In this scenario, the end user would be able literally to put in an order for a particular result and the appropriate applications would work together to

meet that request.

For example, there exist today newspaper clipping services that will go through papers and send customers clippings of stories that deal with particular topics. With OCE, the end user could use a group of applications to achieve the same end.

"Imagine that anybody could empower an agent to put in a request that says, for example, whenever you find any articles about Anita Hill, send me the clipping electronically," Sidhu said.

The application would go through electronic newspaper sources searching for particular key words. Once all have been found, the application might then be programmed to send the clips to the user via E-mail, regardless of the transport system or the front-end application used for the E-mail.

Sidhu conceded that, although these examples may be appealing, they are still a bit of a pipe dream. He predicted applications built on the OCE APIs will not likely be in the works until the beginning of 1994.

He did say, however, that Apple will be able to provide more details about OCE early next year. ■

Interlink to offer TCP/IP

continued from page 17

random-access memory in either a DOS or Microsoft Corp. Windows environment, PCaccess provides support for the File Transfer Protocol and transfer rates of 600K byte/sec.

PCaccess can be loaded coresident with Novell, Inc. NetWare or Microsoft LAN Manager client software on a PC and supports all major token-ring and Ethernet adapters.

Additionally, PCaccess supports Serial Line/Interface Protocol connections for remote ac-

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Do you expect the deepening recession to have any impact on your network budget, operations, or current or planned projects?

“No. We currently don't have the most efficient networks in place throughout the company, so a lot of our plans are geared toward making those networks less costly and more efficient. Those plans will produce clear dollar savings. Therefore, no one is looking to slash our budget.

“I believe we'll remain largely unaffected by the poor economy. We're actually adding more automation to insure that the staff is functioning at the highest level of productivity possible. Essentially, we don't see this as an area where the company will decide to make any severe cost-cutting measures.”

Brent Dell

Vice-president of systems and facilities
AT&T Capital Corp.
Morristown, N.J.

“No. We're somewhat insulated from the recession because there's been a fundamental shift in attitude by the senior administrators who control the budget. Since computing has become a normal part of the workday and nearly every employee is on a network, administrators are paying more than lip service to network technology and are committing more — not less — funding to networking initiatives.”

Greg Scott

Computing services manager
College of Business
Oregon State University
Corvallis

“No. The Electronic Commerce Initiative is justified and funded by the anticipated savings that will be made in the areas where [the program] will be operational. As we deploy the program, it will actually facilitate cost savings in the various military departments and agencies where it is being deployed.”

Jack Bartley

Director
Electronic Commerce Initiative
An electronic procurement system designed to streamline the purchase of products used by the military.
Department of Defense
Washington, D.C.

“Quality is no longer a competitive differentiator; it's now the entry card for doing business. If companies aren't committed to quality, they will soon be out of business.”

Howard Rubin
Chairman
Howard Rubin Associates, Inc.
Pound Ridge, N.Y.



Users put bulletin boards to work as meeting forum

Technology helps expand group access to ideas.

By Maureen Molloy
Staff Writer

A growing number of user groups are leaning toward electronic bulletin board systems as a way to accomplish business goals while limiting costly and time-consuming meetings.

The Data Interchange Standards Association, Inc. (DISA), for example, recently unveiled a new on-line electronic bulletin board to help its members stay current with the latest standards and provide more timely input into the standards development process.

Thomas Prosch, DISA's computer services manager, said the group's trimester meetings and annual conference did not give members sufficient opportunity to get involved in the organization's initiatives.

By implementing the new DISA OnLine Service, users can now regularly communicate with DISA committees, subcommittees and staff members to help support the Accredited Standards Committee X12's efforts to develop electronic data interchange standards.

“This will help streamline the standards development process and cut costs by replacing the additional meetings that would be required to keep members involved in the newest developments,” Prosch said.

Others join in

DISA is one of several groups that have recently started providing members with on-line forums as a way to improve group effectiveness and reduce travel requirements and expenses. Some groups have decided to meet almost solely through networking.

The Network Applications Consortium, a group comprised mostly of Banyan Systems, Inc. customers working to speed the

development of client/server applications for large personal computer nets, has held only two meetings since it was formed last spring. Today, members share information electronically.

“We're literally spread out across the country, so it's not feasible to meet on a regular basis,” said Arthur Beckman, senior vice-president of technology services at the Pacific Gas & Electric Co. in San Francisco and the person who spearheaded the formation of the consortium. “Communicating with other members electronically has kept the geographic distance from becoming a detriment.”

Keeping in touch

The consortium's steering committee members keep in touch using Lotus Development Corp.'s Notes. Beckman said Notes — a groupware application that allows users on local-area nets to share documents and exchange electronic messages — enables the committee to keep one another abreast on particulars of applications and vendors.

The forum has also given the group an added plus, he said, because it allows the consortium to create a database describing applications of interest and allows members to discuss technical issues and strategies.

Another user group that meets largely through networking is the New York/New Jersey branch of the Lotus Notes Users Group. The program was developed last year after it was discovered that many of the over 100 members could not attend the group's quarterly meetings.

“An on-line forum enables users to network with other users in a timely, cost-effective manner,” said Andrew Damico, an engineer at Lotus' Edison, N.J., branch office. ■

Goal definition key to quality programs

Net managers must put objectives in business terms, train workers to carry out corporate plan.

By Wayne Eckerson
Senior Editor

POUND RIDGE, N.Y. — Many network executives are struggling to implement quality programs that deliver bottom-line results, but some programs fail because technically oriented managers do not define quality objectives in business terms.

These same managers tend not to adequately train and educate workers to carry out the quality imperatives or provide the right mix of incentives to motivate them to function effectively in the new quality environment, said Howard Rubin, chairman of Howard Rubin Associates, Inc., a consulting firm based here.

Rubin's firm helps companies assess the performance of their information technology resources as well as their readiness to achieve stated corporate and technology goals.

While many companies vigorously wave the quality flag, few really define what quality is or how to achieve it. Many information technology groups set quality goals that are technology-specific rather than business-oriented, Rubin said.

Instead of investing significant resources to achieve near 100% net uptime, network groups should engineer the net so that outages have a minimum impact on the company, he said.

For example, a bank that boasted 99.9% net availability suffered a network outage one night that prevented the bank from transferring billions of dollars, according to Rubin. The outage prevented the bank from collecting interest on the funds, wiping out the bank's profits for the entire year.

“Not all [network] failures are created equal,” Rubin said. “That's where 99.9% availability begins to fall apart.”

In order to set proper quality targets, network and information systems departments need to carefully evaluate the impact that the technology has on three constituencies: end users, the company's business customers and shareholders, Rubin said. This process can often take a month or more and requires outside consultants to provide objective analysis.

Network managers need to ask what concrete value or benefits

each of these groups derive from a quality goal — such as 100% network uptime — and whether the benefits justify the required investment in time and money to achieve that goal.

According to Rubin, many large companies are beginning to ask managers how each dollar invested in new technologies will improve the quality or profitability of their end product.

“Unless their quality programs are focused on the customer, information technology organizations can fall into the trap of delivering a service or product that does all the wrong things perfectly,” Rubin said.

No quality program can succeed unless employees are educated about quality concepts.



To ensure that quality imperatives are focused on meeting customer needs, information technology groups need to measure both technical processes and the impact that improvements have on customers.

“[Information technology] managers need to look at their own work through their customers' eyes,” Rubin said.

Finally, no quality program can succeed unless employees are properly educated about quality concepts, taught to function effectively in a quality environment and given incentives to apply their skills and knowledge of quality concepts to improve the existing information technology environment, he said.

Employees need to be taught the importance that quality plays in helping the company achieve its mission and strategic objectives, according to Rubin. They need to be trained how to use statistical analysis to measure existing processes and evaluate the results. Workers may also need training in how to work together on quality teams.

“Corporate quality programs won't succeed unless workers are prepared to implement them,” Rubin said. ■

Communications to help you outrun the competition.



The race is to the swiftest, and the right communications systems can help you speed up your customer service, maintain tighter inventory control, track sales data better, and improve the bottom line. Ameritech can help you do all this, and more.

Whether you're a small entrepreneur or a billion-dollar business, you'll find the technologies, services and expertise you need waiting for you at the communications companies of Ameritech.

We've created specialized communications solutions to meet the individual needs of thousands of Great Lakes companies, and we can do the same for you. Because the better you run your business, the better you can outrun your competition.

Solutions that work: From basic business communications to integrated network management products, from yellow pages advertising to equipment leasing, Ameritech has the people, products and services to meet your particular needs.

For more information, just call us at 1-800/242-8580.

The Communications Companies of Ameritech:

Illinois Bell

Indiana Bell

Michigan Bell

Ohio Bell

Wisconsin Bell

Ameritech Audiotex Services

Ameritech Credit

Ameritech Development

Ameritech Information Systems

Ameritech International

Ameritech Mobile Communications

Ameritech Publishing

Ameritech Services

The Tigon Corporation

AMERITECH

GLOBAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

In 1990, outgoing international calling minutes from the U.S. exceeded incoming international calling minutes by 2,661 minutes. This imbalance was the greatest in the world and more than eight times greater than Switzerland's, which was the second highest, according to the International Institute of Communications in London.

World News

Litel Telecommunications Corp., a Columbus, Ohio-based carrier, last week introduced WorldCard, a calling card that travelers can use to pay for calls when abroad.

WorldCard will be supported by Executive Telecard, Ltd.'s international calling service. Executive Telecard has call processors in 28 countries that travelers access via local toll-free numbers. Recorded messages in 14 languages prompt callers to enter the number they are calling and their calling card number.

Callers must enter numbers using push-button, dual-tone, multifrequency telephones, which can be difficult to find in Europe and other areas. Alternatively, callers can use portable tone emitters. Callers can then complete any call within the country or internationally. Executive Telecard also offers operator assistance for calls from 53 countries to the U.S.

Litel will slap a 40% surcharge on standard international direct-dial rates for calls placed using WorldCard. The carrier also charges a \$9.95 annual charge. Company executives say this is less expensive than charges from foreign hotels, which often assess high surcharges on international calls. **■**

ISDN access charges in Europe

Country	Monthly access charge in U.S. dollars		Monthly access charge in European Currency Units	
	BRI	PRI	BRI	PRI
Belgium	\$69	\$828	55.5	666
Denmark	\$25	\$178	20.4	143
France	\$54	\$557	43.0	448
Germany	\$45	\$313	35.9	252
Netherlands	\$45	\$455	36.6	366
U.K.	\$50	\$532	40.2	428

Prices do not include value-added tax.

BRI = Basic Rate Interface
PRI = Primary Rate Interface

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: OVUM, LTD., LONDON, AND FISCHER & LORENZ, COPENHAGEN, DENMARK

ISDN making steady strides across European market

Widespread use of technology expected by 1994.

By Frederic Berge
IDG International News Service

PARIS — Integrated Services Digital Network technology is advancing slowly but surely in Europe, according to a study sponsored by the European Commission.

The study by Ovum, Ltd., a U.K. market research group, and Denmark's Fischer & Lorenz revealed that commercial ISDN services were already available in January in European Community countries such as Belgium, France, Germany and the U.K. while Denmark, Italy, the Netherlands and Spain are currently testing the technology.

Belgium, Denmark, France and the U.K.

This optimistic scenario, however, should not overshadow the obstacles that still block the transition to widespread, interoperable ISDN nets in Europe. According to the study, many of the ISDN networks are limited in terms of geographic coverage. By 1992, only Denmark and France will offer service to nearly 100% of their potential subscribers.

Moreover, the European Community member states use a variety of ISDN versions. Hardware and ISDN services offered — such as subaddressing, which enables users to turn off a specific terminal — are incompatible between countries.

In terms of pricing, the European Community countries have to attempt to standardize their rates, perhaps using other specialized services as a precedent. Pricing disparities among countries position ISDN differently with respect to existing services in each country.

The monthly fee for ISDN BRI service in Denmark, for example, is two times higher than that of a traditional telephone line, while the charge for BRI service in Belgium is seven times higher than the monthly fee for traditional phone service.

The 12 European Community countries say they are preoccupied with problems of standardization and cost, although they welcome the prospect of a fully digital switched network.

To prevent the risk of fragmented European ISDN service, users specified in 1989 that a minimum number of offerings, including caller identification, be offered. These mandatory services are expected to be available by the end of 1993.

(continued on page 22)

U.S. seeks common virtual net standard

Proposal would make it possible to buy the same basic set of virtual net features in any country.

By Joanne Cummings
Staff Writer

KITAKYUSHU, Japan — The CCITT Study Group I met here last week to consider a U.S. proposal for a global virtual network service standard designed to lay a common foundation for all future international virtual net services.

The proposal basically defines the common components of an international virtual network service in an effort to ensure that buyers can purchase these services in any country and still receive a basic set of features, according to carriers and analysts.

"What this means to the customer is that there will be a foundation that is common across all countries so they will know certain things will be standard," said Serge Wernikoff, senior vice-president of international business development at MCI International, Inc., an avid supporter of the proposal. "Customers will know there is a minimum functionality that all carriers are required to provide."

The plan, proposed by the U.S. and largely driven by AT&T, is expected to be finalized sometime next year.

The U.S. Global Virtual Network Service (GVNS) proposal to the Consultative Committee on International Telephony and Telegraphy outlines the basic features and functionality that should be inherent in all international virtual net services and defines a common set of terms.

For example, it portrays GVNS as a "multinetwork international service, which provides private network functions to users at geographically dispersed international locations without requiring dedicated resources."

It also defines how a GVNS user accesses the service, what dialing plans may be used as well as some basic features the GVNS should offer, such as call screening, customer-defined numbering, interfaces to private networks and authorization codes. In addition, it includes definitions of terms such as direct access, switched access, accounting codes and private numbering plans.

The proposal is so basic, some carriers decided not to attend the meeting. "They're just getting some nomenclature for bilateral

(continued on page 22)

U.S.-led consortium gains control of Venezuelan net

By Barton Crockett
Senior Editor

CARACAS, Venezuela — A consortium led by GTE Corp. and including AT&T recently won a bid to buy a 40% stake in Venezuela's monopoly carrier, Compania Anonima Nacional Telefonos de Venezuela (CANTV), for nearly \$1.9 billion.

The sale will bring new management control to a carrier operating one of the world's weakest public networks. It also represents a departure for AT&T, which, until now, has not acquired any ownership stakes in foreign carriers.

Possible public net service improvements in Venezuela would be important to more than 400 U.S.-based multinational companies with operations in Venezuela, including leading automakers, brokerage firms, computer makers and consumer products companies.

GTE announced that its consortium submitted the winning bid earlier this month. The sale is expected to be finalized on or before Dec. 4, according to a spokesman for the company.

GTE will acquire 51% to 60% of the consortium's CANTV stake. The company is still negotiating the terms under which the other consortium members will participate in the deal. In addition to AT&T, those members are Telefonica de Espana, Spain's national telephone company; Electricidad de Caracas, a utility; and Consorcio Inversionista Mercantil Cima, a banking group.

The GTE spokesman said that one of the consortium's priorities will be to improve Venezuela's local telecommunications service. Currently, the country only has about 1.5 million telephone lines, or about eight telephone lines per 100 people. In the U.S.,

(continued on page 22)

U.S. seeks common virtual net standard

continued from page 21

[virtual network] services," explained Andrew Burroughs, vice-president of global marketing at Sprint International. "That's how we interpret it. We don't see this as a big deal."

Although the definitions may seem basic to a U.S. user, they are vital if customers are to purchase common services in different countries, according to Daniel Briere, president of TeleChoice, Inc., a consultancy in Montclair, N.J.

"What's in here is extremely basic to a U.S. user," he said. "But right now, there are virtual networks in development by 43 different carriers worldwide. It's pretty

important that you come up with these definitions."

In addition to standardizing basic functionalities, the recommendation could also lead to more worldwide availability of GVNSs. According to MCI's Wernikoff, there are several countries that have not yet provided a virtual net service simply because the CCITT has not issued a recommendation.

Once a general recommendation such as the U.S. proposal is adopted, these countries may announce services based on the recommendation, he said.

Although the U.S. proposal was mainly

driven by AT&T, the CCITT said its aim is not to come up with a detailed standard based on existing proprietary technology, but instead a standard that will allow users to know what they're buying.

"It's just a definition of what a [virtual private network] is," Briere said. "They're not looking to lock anybody into anything proprietary. They're just looking for everyone to agree on what these basic things are. It's merely saying an accounting code is this, an authorization code is this, a speed-dial button is this."

A spokesman from AT&T, which had sent a large delegation to the meeting, declined to comment on the proposal, saying only that "AT&T is always in favor of open standards." ■

Consortium controls Venezuelan net

continued from page 21

there are about 60 telephone lines per 100 people.

The consortium expects to add about 2.5 million lines to Venezuela's public net over the next 10 years, in addition to upgrading the network with modern technologies. The spokesman could not provide further details about how the consortium expects to improve CANTV's services.

An AT&T spokesman said the carrier has not decided to take an ownership stake in CANTV. Instead, it may participate in the deal through some other, unspecified means. The spokesman added, however, that if AT&T does take a stake in CANTV, it will be the carrier's first equity investment in a foreign telephone company.

But AT&T's involvement in the CANTV bid is not the carrier's first venture in Venezuela. In May, AT&T teamed with Communications Satellite Corp. of Washington, D.C. to form a digital private-line service provider in Venezuela called Transporte Digital de Informacion (TDI), based here.

TDI plans to become the first service provider in Venezuela to offer international, satellite-based digital private-line services, according to Pedro Maisonnave, TDI's chief executive officer. Currently, CANTV only offers analog, international private-line services, and no other carrier competes with CANTV on that front.

Maisonnave said TDI expects to get a license in the first quarter of 1992 to offer digital private-line services in competition with CANTV. TDI is installing a digital, microwave radio net between Caracas and Valencia, Venezuela, that will link users to earth stations aimed at International Telecommunications Satellite Organization satellites covering North, Central and South America as well as Europe, he said.

TDI will probably charge between \$6,000 and \$7,000 per month for the Venezuelan half of a 64Kbit/sec private line to the U.S. The U.S. half is likely to cost less than \$4,000.

Maisonnave said he expects CANTV and TDI to compete vigorously, even though AT&T will probably own an equity stake in both companies. He added that other companies will enter Venezuela's private-line service market, possibly including MCI Communications Corp. and US Sprint Communications Co. ■

The Intelligent Way to Network NETWORLD 92 BOSTON

If you're looking to network smart, there's no need to look any further than NetWorld. Consider the facts. The show brings together hundreds of the network computer industry's biggest exhibitors. Attracts thousands of attendees. Showcases the newest products and services. Delivers all the latest news, information and technology. And addresses today's hottest networking issues through more than 80 timely seminars. Now just think of the networking possibilities. If it's people, products or programs you want to connect with, NetWorld provides a unique business opportunity to deliver all your network options under one roof. NetWorld. It's intelligent networking. In fact, it might just border on pure genius.

FEBRUARY
11-13, 1992
HYNES
CONVENTION
CENTER

Call 800-829-3976
for show information.

Watch for NetWorld's New Executive Seminar Series
**NETWORKS: LINKING
WORLD-CLASS ORGANIZATIONS**

ISDN making steady strides across mart

continued from page 21

In the meantime, France and Germany have chosen to establish international links between their ISDN nets to support services such as caller ID and subaddressing.

This European coordination effort supports the standards work under way at the European Telecommunications Standards Institute. Established in 1988 in Sophia-Antipolis, France, this institute has already made significant headway in the ISDN arena. In fact, it has finalized several European standards that target worldwide applications.

Four of these standards concern ISDN BRI and PRI access and cover the minimum guarantees, such as security, that are necessary to connect to a network. According to the study, these norms will be finalized and published by year end. ■

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

NEC America unveils codec, multipoint bridge

NEC America, Inc. recently unveiled a low-end video coder/decoder and multipoint videoconferencing bridge that offer a less expensive entry point for prospective users of its videoconferencing products.

The new **VisuaLink 5000 Model 15** is a full-motion, color video codec that supports videoconferences at speeds ranging from 56K to 384K bit/sec using proprietary compression algorithms or algorithms based on Px64 videoconferencing standards.

The Model 15 is priced at \$35,000. Previously, NEC's least expensive video codec was the VisuaLink 5000 Model 20, which costs \$44,000.

The new multipoint videoconferencing bridge is the 4 Port MCU 5000. This bridge costs between \$83,000 and \$84,900, depending on configuration, and can link as many as four remote codecs into a single videoconference at speeds ranging from 56K to 2.048M bit/sec. Previously, NEC only sold the 8 Port MCU 5000, which ranges from \$105,000 to \$108,000, depending on configuration.

NEC America, Inc., Data and Video Communication Systems Division, 110 Rto Robles, San Jose, Calif. 95134; (408) 433-1277.

Olicom intros remote bridge based on OS/2

Olicom USA, Inc. recently released remote token-ring bridge software designed to operate in a nondedicated OS/2 server.

The **OS/2 Remote Bridge 16/4** is a source-routing media access control-layer bridge that links two remote token-ring local-area networks. It is designed to run in an OS/2 personal computer, which can be used concurrently as a LAN server. The bridge, which does not require a dedicated token-ring adapter, supports wide-area network link speeds up to 128K bit/sec.

Available now, the product is priced at \$3,100.

Olicom USA, Inc., 1002 N. Central Expwy., Richardson, Texas 75080; (214) 680-8131. ☐

Controller gains GOSIP certification

By Joanne Cummings
Staff Writer

DALLAS — Harris Adacom Corp. recently said its IBM 3174-compatible controller has been certified as compliant with the Government Open Systems Interconnection Profile (GOSIP).

The vendor's Challenger ES/174 Extended System is the first 3174-class controller to gain GOSIP certification, meaning federal government users with large Systems Network Architecture terminal networks can now conform to the protocol.

GOSIP is a set of standards that defines how government networks will support the OSI model. Beginning in August 1990, government agencies were mandated to purchase only GOSIP-compliant networking products.

ES/174 was certified by CDA, Inc., an accredited National Institute of Standards and Technology test laboratory.

The product comes in three models, two of which are rack-

mountable. All models support IBM's SNA and X.25 protocols concurrently. The high-end rack-mountable Model 10 can support 128 coaxial-cable devices as well as 34 ASCII devices. It can also support four IBM host connections, two of which may be channel-attached.

In addition, the Model 10 supports Multiple Logical Windowing. This means that IBM 3270-type terminals communicating through the controller to the host can display five concurrent-session windows consisting of IBM host sessions, asynchronous host sessions or a notepad.

The rack-mountable Model 20 offers all the features of the Model 10, but it supports just 64 coaxial-cable devices, 10 ASCII devices and one mainframe channel attachment.

The Model 60, which is a low-end stand-alone unit, can support 32 coaxial-cable devices and three ASCII devices. It also supports as many as four mainframe links, none of which may be channel-attached.

All models are available now. Pricing ranges from \$3,000 for a Model 60 to \$46,580 for a Model 10.

For more information, contact Harris Adacom at 16001 Dallas Pkwy., Dallas, Texas 75248, or call (214) 386-2000. ☐

SofNet fax server software gains standards support

ShareFax supports EIA Class 1 and 2 standards.

By Joanne Cummings
Staff Writer

MARIETTA, Ga. — SofNet, Inc. recently announced that it has enhanced its ShareFax facsimile server software to support nascent fax modem standards as well as several new features.

Like the previous version, the ShareFax 2.5 software for DOS-based servers is outfitted with fax boards and enables local-area network-attached personal computers to send and receive faxes. The company recommends using the enhanced software with Intel Corp. 80386SX-based PCs but said it can also be used with Intel 80286 machines.

With the upgrade, ShareFax 2.5 supports all fax modems that comply with EIA Class 1 and Class 2 standards, which describe how fax capabilities are integrated into modems.

Like the previous version, ShareFax 2.5 will support Hayes Microcomputer Products, Inc.'s JT Fax 9600B and Intel's Connection CoProcessor and SatisFAXtion fax boards.

The expanded support will enable ShareFax 2.5 to work with roughly 95% of the current base of fax modems, according to Matt Thompson, director of business development at the company.

The new version also allows users to view and print their incoming faxes from their workstations. Faxes must be routed by a fax administrator. Previously, users could only view or print incoming faxes from one machine configured as the fax server.

ShareFax 2.5 includes a graphical user interface that is compatible with IBM's Systems Application Architecture Common User Access interface. This is a standard IBM interface for DOS applications that adds mouse support to the product.

ShareFax 2.5 is available now for \$149 for a two-workstation license and \$399 for an eight-user license. Users can add workstations for \$35 each.

For more information, contact SofNet at 775 Franklin Road, Suite 101, Marietta, Ga. 30067, or call (404) 499-0007. ☐

Firm's software to link Windows worlds

AGE to introduce software that lets Microsoft Windows users access X Window applications.

SAN DIEGO — AGE next week is expected to unveil software that enables users to employ Microsoft Corp.'s Windows as a local workstation manager to initiate server-based X Windows system applications.

The offering, called XoftWare for Windows, enables users with an installed base of Microsoft Windows workstations to maintain their investment in the graphical user interface, while also taking advantage of X Window-based applications.

Using XoftWare for Windows, users can configure Microsoft Windows icons to start specific network-based X Window applications, giving them the look and feel of traditional Microsoft Windows applications, the company said.

The software resides on personal computers running Windows 3.0 or 3.1. It also supports the X11R4 version of the X Window System. XoftWare for Windows supports a variety of X Window start-up modes, including XDMCP, Telnet, rsh, rexec and passive.

XoftWare for Windows handles low-level conversions from X Window System protocols to Microsoft Windows function calls, creating a link between the two environments. This enables

users, for instance, to cut and paste data between Microsoft Windows applications and X Window System applications.

Choice of two modes

X Window applications can be started in XoftWare for Windows's single- or multiple-window mode. In single-window mode, a Microsoft Window is opened in which the entire X session is run. The user can, in this mode, run one or more X applications concurrently along with Windows managers, such as OpenLook, Motif and DECwindows.

In multiple-window mode, the Microsoft Windows manager is used exclusively. Each X application is mapped into a separate window that can be moved or resized using Microsoft Windows. This provides the user with a fast local window manager and frees the network from window manager traffic inherent in single-window mode.

XoftWare for Windows will be available by the end of December. It costs \$495 per local workstation.

For further information, contact AGE at 9985 Pacific Heights Blvd., Suite 200, San Diego, Calif. 92121, or call (619) 455-8600. ☐

Cipher airs tape backup for local nets

SAN DIEGO — Cipher Data Products, Inc. recently announced a new line of high-performance backup systems designed for local-area and enterprisewide networks.

The Ciera line is a ½-in. tape subsystem that attaches to a network and offers significantly faster backup rates than traditional 8mm tape drive systems, Cipher said.

Due to proprietary software algorithms, the time to back up or recover data is cut by as much as 25% when using a Ciera system vs. a typical 8mm tape drive, the company said.

The systems are designed for use in Novell, Inc. and Unix

client/server environments. The company also expects to add Microsoft Corp. Windows 3.0 support by the first quarter of next year.

The Ciera line of network backup systems comprises a 2.6G-byte tape drive, software and a Small Computer System Interface (SCSI) host adapter designed to fit in a file server or workstation expansion slot.

The product line ranges from entry-level offerings designed for small LANs to multitape drive configurations for large nets.

The products are currently available. Pricing for an entry-level system begins at \$7,500, which includes a 2.6G-byte tape drive, SCSI controller, software and SCSI bus terminator. Other configurations range from \$9,000 to \$11,000, depending on software and accessories.

For more information, contact Cipher at 10101 Old Grove Road, San Diego, Calif. 92131, or call (619) 693-7713. ☐

OPINIONS

FACSIMILE

BY PETER DAVIDSON

Fax: It's a long way from being obsolete

In the early 1980s, many market researchers, myself included, doubted the future of facsimile technology. It was paper-oriented and rooted in the past. We thought electronic mail, which is paperless and personal computer-oriented, would surely leave fax in the dust of its thermal paper shavings. Boy, were we wrong.

While it's clearly true that fax is an imperfect solution in a highly computerized world, the technology most definitely has both a present and a future. Currently, and in some respects for many years to come, fax will be the only available messaging technology through which any kind of document — PC- or paper-based and consisting of any manner of text and image created on any type of software — can be sent with ease to virtually anyone anywhere.

Sending computer files as faxes will become as easy as printing those files.

▲▲▲

It will be a long time before a user will be able to send a document through any gateway to another user with any other type of E-mail, not to mention the time span before everyone has E-mail capabilities. You can send E-mail to any user, but you may have to master hieroglyphic-like, seven-field X.400 addresses to do so. If you

attach a complex document to the memo, additional uncertainties will arise.

Furthermore, fax may well be on the doorstep of an era of unprecedented integration with computers. Such integration hasn't occurred to date because there has not been a standard interface between fax systems and computers. Lack of such an interface has required developers to produce different products for each fax board and machine. Consequently, many vendors have simply avoided developing anything.

Interface emerging

Just such an interface may be emerging right now. When that is established, we'll see vendors bringing out optical character recognition modules for facsimile systems to allow faxed alphanumerics to be converted to ASCII code for automatic entry into computer systems. Links between computer databases and fax systems will allow information in those databases to be faxed automatically. Sending computer files as faxes will become as easy as printing those files. And with the emergence of a new fax compression standard from the Joint Bilevel Image Experts Group, fax may become an efficient data entry vehicle for nontransactional image databases.

While it may be easy to find fault with fax for its scrolling paper, lack of security and interim technology label, E-mail comes with its own set of problems. One is the aforementioned hieroglyphic addressing quandary. Also, E-mail sometimes gets addressed to the wrong person or broadcast to everyone when only a single recipient was intended. In addition, lots of people don't use computers or check their E-mail boxes often enough when they do. At least you can see faxes when they arrive.

As I thought in the early '80s and as fax doomsayers assert, E-mail theoretically provides file-transfer efficiencies that fax cannot match. However, I've learned that predicting fax's demise is a risky business. We might all be better off leaving that to the marketplace of the 21st century — or perhaps I should say the 22nd century. ■

Davidson, a voice and data consultant, is editor of FAXreporter, a newsletter for Buyers Laboratory, Inc. in Hackensack, N.J.

NETWORK WORLD

Editor
John Gallant

Executive Editor
John Dix

Assistant Managing Editor — News
Charles Bruno

Senior Editors
Bob Brown — Industry Update
Barton Crockett — Global Networks
Paul Desmond — Data Communications
Wayne Eckerson — Management Strategies
Bob Wallace — Telecommunications

Caryn Gillooly — Local Networking
5423 Gladewright Drive
Centreville, Va. 22020
Phone: (703) 266-1537
Fax: (703) 266-1543

Jim Duffy — Data Communications
115 E. 27th St., #1C
New York, N.Y. 10016
Phone: (212) 481-3095
Fax: (212) 679-0147

Staff Writers
Maureen Molloy — Internetworking
Joanne Cummings

West Coast Bureau
Timothy O'Brien
Bureau Chief/Network Software
2088 Union Street, Suite 2
San Francisco, Calif. 94123
Phone: (415) 771-3530
Fax: (415) 771-2817

Washington D.C. Bureau
Anita Taff — Bureau Chief
Phone: (202) 879-6744

Ellen Messmer — Correspondent
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
Phone: (202) 879-6752

Features Editor
Paul Strauss

Managing Editor — Features
Jim Brown

Associate Features Editors
Alison Conliffe
Susan Collins

Features Writer
Salvatore Salamone

Design Editors
Susan Champeny
Susan Slater

Assistant Managing Editor — Production
Beth Khoury

Copy Editors
Michelle Beaulieu
Skip MacAskill
Elizabeth Marshall
Karen Moltenbrey

Assistant to the Editor
Cheryl Tynan

Editorial Assistant
Glenna Fasold

Contributing Editors
Daniel Briere
James Kobielski
Alan Pearce

Teletoons
Phil Frank
Joe Troise

President/Publisher
Colin B. Ungaro

Director of Financial Operations
Mary Fanning

Network World, 161 Worcester Road, Framingham, Mass. 01701
(508) 875-6400, MCI Mail — 390-4868, Fax: (508) 820-3467

USER ADVISORY PANEL

Laurie Brice
Manager, Communications Technology,
Boeing Computer Services

Roy Bruce
Senior Adviser, International Communications Association

Phillip Evans
Director, Telecommunications, FMC Corp.
Senior Advisor, International Communications Association

Len Evenchik
Director of Communications,
The Commonwealth of Massachusetts

Thomas Festa
Communications Director, Liberty Brokerage, Inc.

Lionel Gillerman
Telecommunications Services, McDonnell Douglas
Aerospace Information Services Co.
Vice-President for Regulatory Affairs,
Telecommunications Association, Inc.

Robert Hamilton
Information Technology Engineer, Hewlett-Packard Co.
President, Telecommunications Association, Inc.

E.W. Bud Huber
Senior Consultant, Hughes Aircraft Co.
Chairman, User Alliance for Open Systems

Michael Kaminski
Manager, CIM/Networking Technologies
General Motors Corp.

Michael Kilbane
President, International Communications Association
General Manager of Systems Development,
Diamond Shamrock R&M, Inc.

Ron Kopitowsky
Telecommunications Director, Metropolitan
Transportation Authority of New York State
First Past President
Communications Managers Association

Charles Murray
President, Communications Managers Association
Telecommunications Director, The Travelers Insurance Co.

Chuck Papageorgiou
Network Administrator,
United Parcel Service, Inc.

Henry Pfendt
Director, Information Technology Services,
Eastman Kodak Co.

Kenneth Phillips
Vice-President, Office of Telecommunications Policy,
Citicorp
Chairman, Committee of Corporate
Telecommunications Users

William Pomeroy
Director of Telecommunications Public Policy,
International Communications Association

Richard Sidoli
Telecommunications Director, Morgan Stanley

Stanley Welland
Manager, Corporate Telecommunications
General Electric Co.

Ronald West
President, Association of Data Communications Users
Manager of Telecommunications and Office Automation,
Shearman & Sterling

EDITORIAL

User conference advances U.S. open systems movement

The open systems movement last week reached a milestone — one that had little to do with new products or technology.

The movement benefited from the first User's Open Systems Conference, an event that brought together the leading user-oriented open systems organizations in a concerted effort to embrace and implement open systems in the U.S.

The conference, hosted by the Corporation for Open Systems International (COS) in Reston, Va., served as an umbrella forum for a North American MAP/TOP Users Group meeting, the National ISDN 1 Planning Conference, the annual membership meeting of OSINET Corp., the semiannual COS Board of Directors membership meeting and the fall meeting of the User Alliance for Open Systems.

The conference featured an array of tutorials and sessions

covering the difficult open systems implementation, planning, migration and business case issues users face today. It also offered a product fair designed to give users a look at the growing number of available open systems offerings and services.

In addition, the conference provided users the unique opportunity to question top executives from key computer companies, such as Apple Computer, Inc., Digital Equipment Corp. and IBM, about their commitment to and vision of open systems during a session called the Industry Power Panel.

We applaud COS for its vision and efforts to bring these leading open systems organizations together in a single event, showcasing the growing user commitment to open systems and giving users a powerful forum in which to voice their needs and concerns.

By giving greater visibility to

these organizations and its own work through this conference, COS has advanced the open systems movement and increased awareness of the need for open systems support on the part of both vendors and users.

We continue to praise organizations such as the North American MAP/TOP Users Group and the User Alliance for their missionary work in the open systems arena. These grass roots groups are spreading the message that open systems can help users boost productivity and profits.

As the executive representation at the User's Open Systems Conference attests, vendors are getting the message about open systems.

Thanks to the work of COS, other open systems groups and events such as this conference, the open systems movement is finally beginning to snowball. ■

OPINIONS

DISTRIBUTED COMPUTING

BY JOHN R. RYMER

New mgmt. applications herald a practical era

Until recently, the communications industry has been stuck in an architectural rut with network and systems management. However, a new batch of recently released products — such as the Wisdom Distributed Object Management system from Tivoli Systems Corp., the Action Request System from Remedy Corp., BindView+ from LAN Support Group, Inc. and Expert Sniffer from Network General Corp. — illustrates that the industry is finally beginning to generate the management applications that users really need to solve problems.

In addition, users can expect a virtual flood of new management applications and tools during the next year.

More often than not, the new applications use the management application platforms put in place by the major systems vendors for distributed, multi-vendor environments.

In doing so, they validate the network management platform concept that coordinates collection and delivery of alarms and alerts for management applications.

These applications also signal two important shifts in network and systems management that are likely to provide users with more useful solutions than they've had in the past.

First, the new generation of management applications, epitomized by the Open Software Foundation, Inc.'s Distributed Management Environment, addresses systems and network management. The industry has focused primarily on the management of network devices.

However, systems management — the administration of node configurations, user accounts, groups, applications, security and the like — is the more important of the two disciplines

Rymer is vice-president of Patricia Seybold's Office Computing Group in Boston and editor in chief of the company publication Network Monitor.

in managing a distributed environment.

Second, the new generation of management applications makes real progress in taking the administration of systems and networks out of the hands of specialists. The best of the new applications use graphical user interfaces and filtering to make network and systems data accessible to a wider variety of users.

Why are all these applications appearing now? Part of the answer lies in the foundations for management applications that systems vendors have been establishing during the past few

For users with diverse systems, multivendor platforms are the best choice.

▲▲▲

years. But that's not the whole story. Software developers are not necessarily writing applications for the most complete and well-designed management platforms. Rather, they are going for volume.

The unspoken goal of these applications is to reduce the labor and the costs required to manage distributed environments. Each of the applications seeks to accomplish this by automating route tasks, making management accessible to non-technicians or both.

To thrive, vendors of the new systems and network management applications must carefully handle the emphasis on cost reductions.

Ironically, to succeed, these vendors must appeal to systems and network management specialists who have an interest in preserving their central position in network and systems management. As management tasks are delegated to end users, the im-

portance of today's systems and network administration specialists may be reduced. Some workers may even be automated right out of their jobs.

But wait. Why will systems and network management specialists adopt products that reduce the organization's dependence on their knowledge and skills?

John Payne, a communications architect at DHL Airways, Inc., says he believes the general move in corporations to reduce costs will drive acceptance of products that can be demonstrated to reduce or eliminate fixed and recurring expenses. Payne views the labor-intensive nature of systems management and administration as a part of the bigger challenge of reducing costs.

Overall, the range of new management applications and tools scheduled for arrival this year and next is impressive. They will finally deliver useful management functionality to users. However, users face some migration obstacles before putting these tools to use.

The biggest issue is that the companies leading the charge in this field are small established consultancies and venture-funded firms. In either case, prudent users should carefully inspect each candidate's business plan before selecting a vendor.

Next, some of the new applications and tools require the user to install a particular systems management platform. Where management platforms exist, users should adopt them. For users with diverse systems, multivendor platforms such as Hewlett-Packard Co.'s OpenView are the best choice.

Finally, be forewarned that the new management products are bound to cause a reassessment of management policies, personnel and practices.

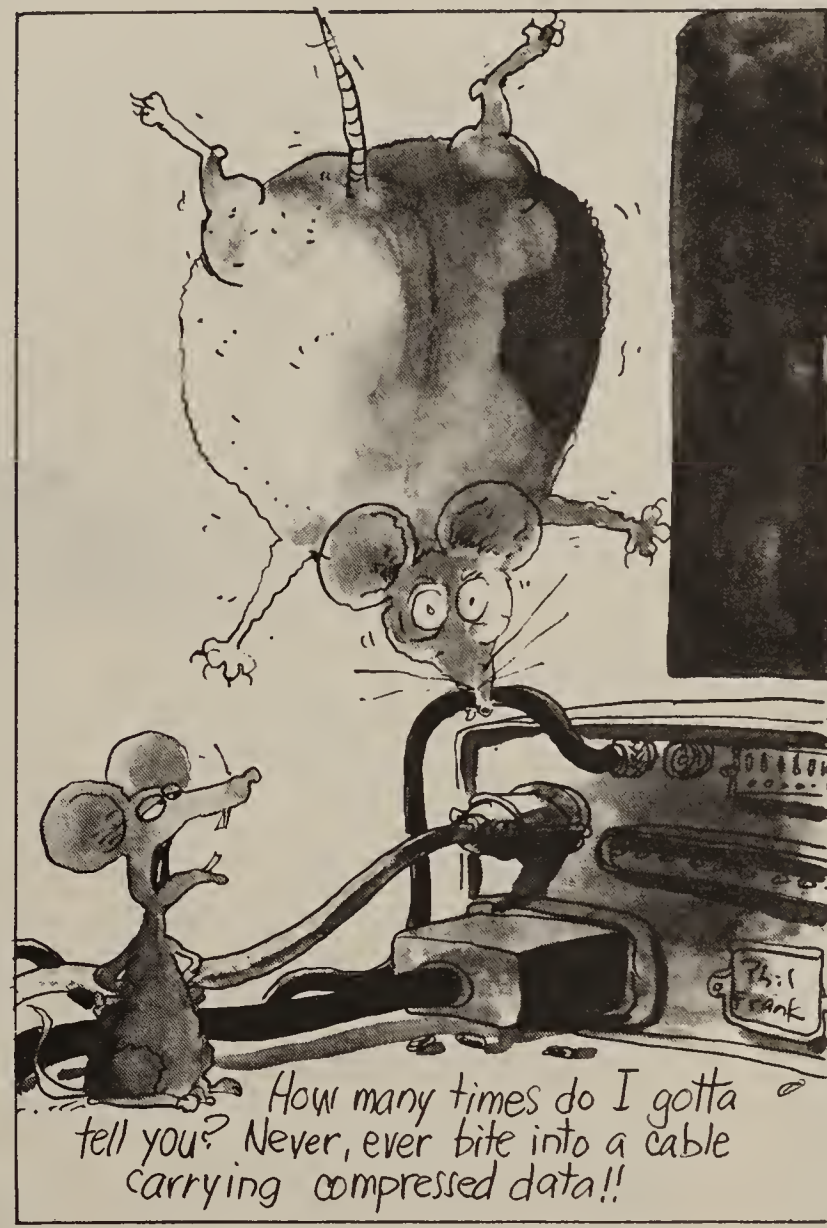
Network and systems managers should begin planning ahead so that the inevitable changes can be made as smoothly as possible. ▣

LIKE ALLIGATORS IN A SWAMP, unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, associate features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

TELETOONS

BY FRANK AND TROISE



and another thing . . .

No turkeys on this list . . .

As Thanksgiving approaches, it's a good time for network users to consider a few communications developments for which they should be thankful, such as:

■ **Frame relay.** This technology lets users access greater amounts of bandwidth on an as-needed basis to help support the growing number of applications generating bursts of traffic such as local-area network interconnection. It also enables users of X.25 packet networks to upgrade to a more efficient protocol that reduces network delay in routing packets between sites.

■ **Distributed computing.** This software technology enables users to break an application into several portions, each running on different computers on a network. Thus, users gain some independence and individuality that traditional software technology does not supply. Where users were once tied to the whims of the mainframe, different departments within the same organization today

can install systems that suit their individual needs.

■ **Freedom of choice between local carriers.** The Federal Communications Commission has mandated that local exchange carriers must allow alternative carriers to collocate equipment in their central offices. This order gives more users a choice of carriers to transport traffic to long-distance networks. Previously, only users in buildings wired by alternative access providers had such a choice.

■ **Internetworking.** Users with internetworking can create one seamless network — or a network of networks — that links users across the entire corporation. Internetworking also provides the basis for distributed computing and supports emerging client/server applications.

■ **Systems Network Architecture.** Finally, users should be thankful for SNA. IBM takes its raps now and then, but what other vendor's networking architecture has worked for so many for so long? ▣

At 600 x 600 dpi, the new IBM for any image.

*HP LaserJet III
with PostScript option:
300 x 300 dpi, max.*



Courier
Courier Oblique
Courier Bold
Courier Bold Oblique
Times New Roman
Times New Roman Italic
Times New Roman Bold
Times New Roman Bold Italic
Helvetica
Helvetica Italic
Helvetica Bold
Helvetica Bold Italic
Helvetica Narrow
Helvetica Narrow Italic
Helvetica Narrow Bold
Helvetica Narrow Bold Italic

Times
Times Bold
Times Italic
Times Bold Italic
Univers
Univers Bold
Univers Italic
Univers Bold Italic

*Sixteen scalable fonts, built in—twice
as many as an HP LaserJet. And
our fonts are Type-1. Theirs aren't.*

IBM
LaserPrinters

There's no end to the ways the new IBM LaserPrinters can make a body look good.

For starters, there's an Adobe® PostScript® option that delivers a true 600 x 600 dots per inch. It gives you up to *four times* the resolution of PostScript on any HP LaserJet® printer. Camera-ready output, on your desktop, for thousands of dollars less than ever before.

But the eye-catching advantages of the new IBM LaserPrinters aren't just for PostScript users.

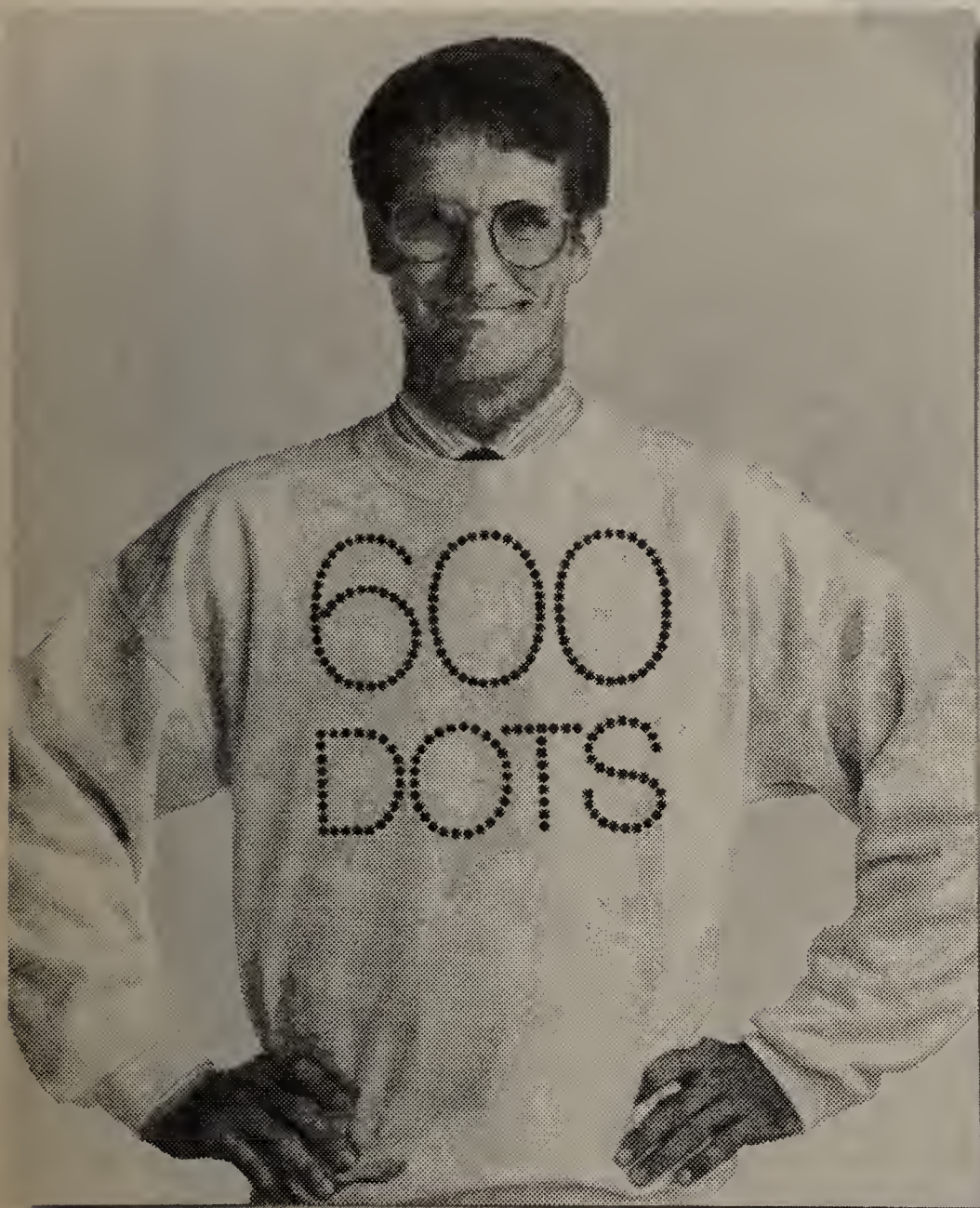


*HP LaserJet jump-gap
toner system vs. our
contact-transfer. A clean win
for the IBM LaserPrinter.
(10 x enlargement)*

600 x 600 dpi PostScript option, available for LaserPrinter 6, 10 and 10L, requires 5MB total memory. Adobe and PostScript are registered trademarks of Adobe Systems Inc. HP and LaserJet are registered trademarks of Hewlett-Packard Company. AppleTalk, Macintosh

THE NEW IBM LASER

LaserPrinter does wonders Especially yours.



*IBM LaserPrinter
with PostScript option: 600 x 600 dpi—
up to four times the resolution.*

Sixteen built-in scalable fonts are standard equipment—twice as many as the LaserJet III. They're Type-1 fonts with Adobe scaling technology, online and always ready, without waiting for downloads.

IBM
PQET

LaserJet
RET

RR

*Can't see the difference?
No wonder. Our PQET
enhancement is the equal of
anything in the industry.*

Also standard on every new LaserPrinter: crisper type and graphics than ever, thanks to sophisticated new Print Quality Enhancement Technology (PQET).



*The new IBM
LaserPrinters: the leading
edge, made sharper.*

And Macintosh® users, take note: with the *IBM LaserPrinter Option for AppleTalk® Networks*, the new LaserPrinters fit beautifully into your Mac® environment.

Right from page one, the new IBM LaserPrinters make everything from simple correspondence to slick desktop publishing look crisp, clean, and cutting-edge.

Which makes you look extraordinarily sharp too.

For your nearest dealer, call 1 800 IBM-2468, ext. 804. In Canada, call 1 800 465-1234.

LEXMARK™

*Manufacturer and distributor of
IBM LaserPrinters.*

and Mac are registered trademarks of Apple Computer, Inc. IBM is a registered trademark of IBM Corp. in the United States and/or other countries and is used under license. Output produced with LaserPrinter 10 at 600 x 600 dpi. ©1991 Lexmark International, Inc.

PRINTERS. PAGES AHEAD.

SEVENTH ANNUAL
**USER
EXCELLENCE
AWARDS**

Columbia Gas bets its future on networking

By SALVATORE SALAMONE



For some companies, implementing network technology means more than just gaining a competitive edge or strategic advantage. It is the difference between survival and failure.

Columbia Gas Transmission Corp., a subsidiary of Wilmington, Del.-based Columbia Gas System, Inc., has found itself in just that position. The firm is betting that a \$21 million network upgrade will not only help it win new customers with more accurate and timely billing procedures, but also cut operational costs.

If successful, the network could play a key role in helping the company overcome financial hardships resulting from long-term gas purchase contracts. Those agreements were negotiated with natural gas suppliers in the mid-1980s for prices that were considered favorable at the

Salamone is Network World's features writer.

time. The arrangements have forced the company to resell its gas at a price higher than that of most of its competitors, which have experienced similar problems but may not have been locked into as many long-term contracts or were able to secure better prices when those contracts expired.

Compounding Columbia Gas' problem is federal deregulation of the gas industry, which enables utilities and regional gas distributors to purchase gas on a spot market. A spot market offers gas at a price set by market factors.

Columbia Gas' financial woes came to light earlier this year when the company told analysts it stood to lose as much as \$1 billion this year. The problems forced parent company Columbia Gas System — the fourth largest natural gas company in the nation, with annual sales of \$2.8 billion and eight million customers in a 15-state region — to file for Chapter 11 bankruptcy protection from creditors in July.

While this financial situation was brewing, Columbia Gas' network personnel, backed by upper management's willingness to

take investment risks, took the long-term view and linked the company's future to networking.

For its innovative use of networking as part of its bid to recover financially, Columbia Gas has been named a cowinner in *Network World's* Seventh Annual User Excellence Awards.

The company is installing an electronic measurement system that will record how much gas customers draw off its pipeline system. It will then feed this data back to headquarters. Armed with this information, Columbia Gas hopes to improve customer service and billing.

The electronic measurement system will be installed at the same time that Columbia Gas upgrades its existing Supervisory Control and Data Acquisition (SCADA) network, which is used to monitor and control the flow of one to two billion cubic feet of gas through Columbia Gas' system of pipelines and pumping stations each day.

Networking staffers were already planning to upgrade the SCADA net and took the opportunity to piggyback installation of
(continued on page 30)

Gas company depends on investment in networking technology in high-stakes gamble to survive financial hardships.



COLUMBIA GAS

Transmission



Pictured from left to right: Randy Jones, contract network engineer; Bruce Cavender, supervisory telecommunications network engineer; and Rockie Brown, network engineer.

PHOTOGRAPHY ©1991 WALTER P. CALAHAN

(continued from page 28)

the electronic measurement system on top of that project.

This networking project is now underway and, when completed next year, will help Columbia Gas in several ways. Some benefits have already been achieved and others are anticipated.

For example, the company has already consolidated data centers, reducing the number of Digital Equipment Corp. VAX mini-computers at those sites from six

tween when Columbia Gas delivers the gas and when it is paid.

Fighting to save the company

Columbia Gas purchases natural gas from suppliers, such as Energy Development Corp., Exxon Corp. and Meridian Oil Production, and transports it from the Gulf of Mexico to the mid-Atlantic region via a pipeline. The company then sells the gas in its pipeline system to regional gas distributors, large utility companies and local communities. The pipe-

Demand for more timely information is coming from internal staff as well as customers. Columbia Gas personnel need the information to monitor and control the gas flow in the pipeline system.

The SCADA and electronic measurement project will go a long way toward satisfying both groups. But both projects rely on Columbia Gas' backbone network that links its data centers. Network staffers chose a dual T-1 ring to connect three regional

tached to modems, which transmit collected data over an X.25 network to a Timeplex, Inc. packet switch in one of the three data centers (see Figure 2, this page). Flow computers used for electronic measurement will use X.25 when installed. However, the migration to X.25 will take place gradually for the SCADA flow computers.

At each data center, the packet switch forwards SCADA information to a DEC VAX 6320, which is interconnected with VAX 6320s at the other data centers over the T-1 network. Electronic measurement data is transmitted to one of three DEC VAX 4000 computers, two of which are located at the Charleston data center and one at the Bethel Park site.

Interconnecting the VAXes via the dual T-1 ring enables any one VAX to pick up processing for another that fails. Columbia Gas also has route diversity and redundancy in its T-1 network that enables traffic from a failed link to be rerouted over a functioning link.

The redundancy is achieved by using two StrataCom, Inc. IPX fast packet multiplexers at each site. Each IPX has two T-1 lines, one to each of the other two sites. "These multiplexers were selected for their fast rerouting capabilities and for their [highly reliable] reputation," says Bruce Cavender, supervisory telecommunications network engineer at Columbia Gas.

Connected to each mux are a Vitalink Communications Corp. Ethernet bridge and a packet switch. Each bridge is attached to a separate Ethernet local-area network. Each VAX also has separate links to both LANs. This enables users on workstations at any data center to access information stored on any VAX.

"The way the system is de-

work design has enabled the company to eliminate one VAX 6320 at each of the three data centers.

Keeping the goal in mind

The wide-area network's main purpose is to provide the means of exchanging information about the pipeline's gas flow. It is there to support the SCADA operations.

SCADA is nothing new. Gas

"The industry in general is becoming more of a day-to-day operation."

▲▲▲

control and monitoring networks have been used by the gas industry and Columbia Gas since the 1950s. SCADA enables central site personnel to perform a variety of tasks, including opening and closing pipe valves and monitoring the pipeline's pressure.

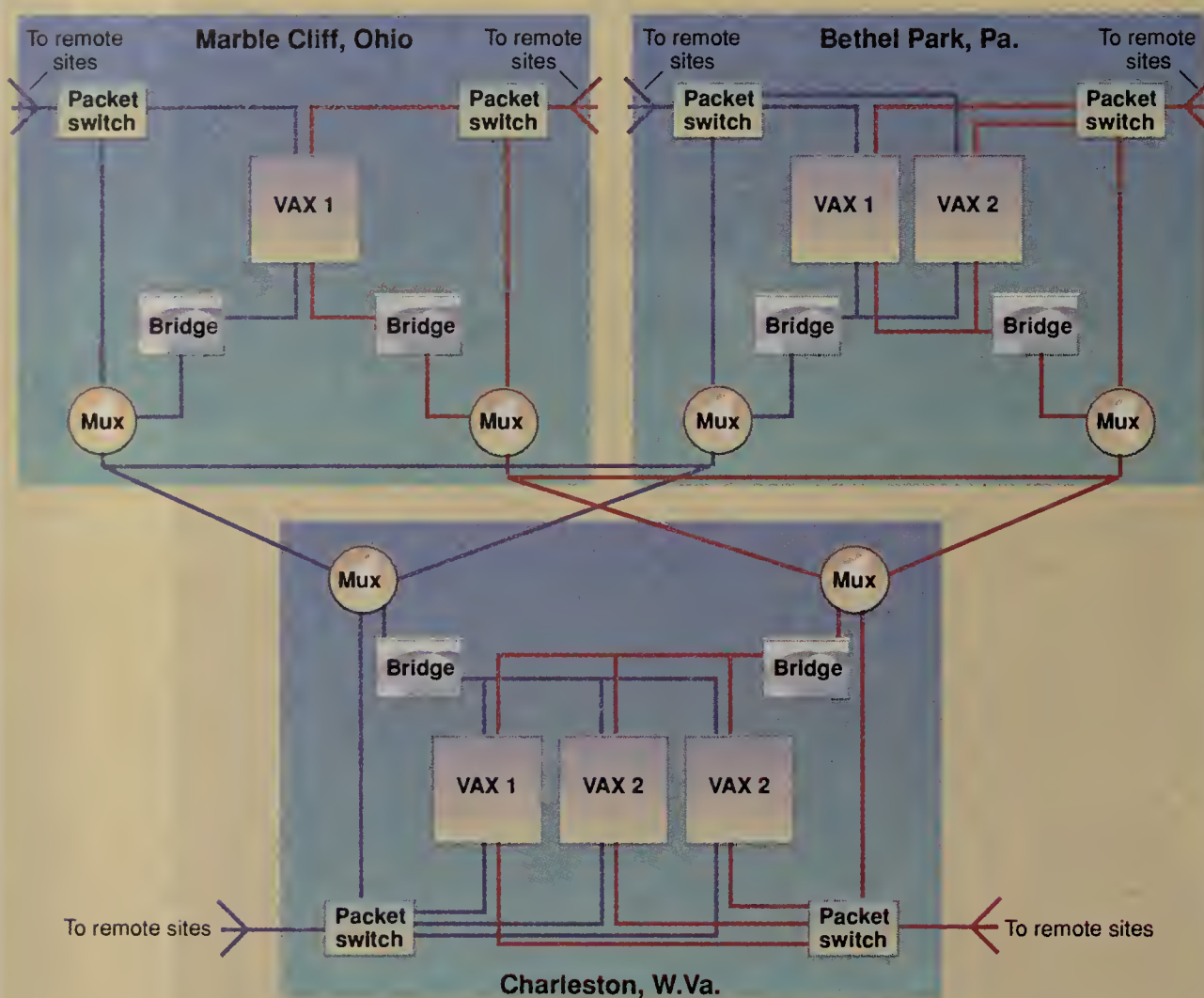
The upgrade to Columbia Gas' SCADA network will connect equipment in 200 field sites to VAXes in the data centers. The new network will allow the company to get more information in real time and at less expense than with the previous system.

Gas control operators in two of the data centers monitor the gas flow via workstations on the Ethernet LANs. Operators control the flow of gas through the pipeline by issuing workstation commands that are transmitted over the network to a remote flow computer, which executes them.

The SCADA network is vital to the operation of the pipeline.

Piping information over Columbia Gas' WAN

Figure 1



Ethernet bridges by Vitalink Communications Corp. Vax 1 by Digital Equipment Corp. for Supervisory Control and Data Acquisition Muxes by StrataCom, Inc. Vax 2 by DEC for the electronic measurement system

GRAPHIC BY SUSAN SLATER

SOURCE: COLUMBIA GAS TRANSMISSION CORP., CHARLESTON

to three. It also expects to reduce the average monthly line costs of linking pumping stations to the data center by 30%, from about \$215 per month to \$150 per month by switching to an X.25 packet network from the current circuit-switched network.

Customer satisfaction was a major factor when the electronic measurement system was proposed.

Customers are demanding to know, often on a daily basis, how much gas they've drawn off Columbia Gas' pipeline. And because the spot market for gas is growing, customers can shop around if they are not satisfied with their company's performance.

Speeding the flow of information to the customer has an additional benefit for Columbia Gas. By keeping more accurate and updated records of how much gas a customer has drawn, the company can bill that client more quickly in an attempt to reduce its float period, which is the time be-

line has taps from which customers draw gas to meet their needs.

Columbia Gas supplies a specified amount of gas to customers under contract. But because the company buys its gas at a rate higher than the going market rate, it must pass that cost on to its customers.

Once contractual agreements with Columbia Gas are fulfilled, customers are free to buy additional gas from any source. For example, they can go to a spot market where gas is sold at the market-driven rate, rather than a fixed rate.

"The gas industry in general is becoming more of a day-to-day operation instead of month-to-month," says George Yeager, manager of engineering telecommunications at Columbia Gas. "The nature of the business is requiring more real-time information."

By giving customers this real-time information, Columbia Gas hopes to build customer loyalty and, thus, sell more gas.

data centers in Marble Cliff, Ohio, Charleston, W.Va., and Bethel Park, Pa. (see Figure 1, this page). This ring enables data collected by SCADA and electronic measurement equipment to be shared between host computers in the three sites.

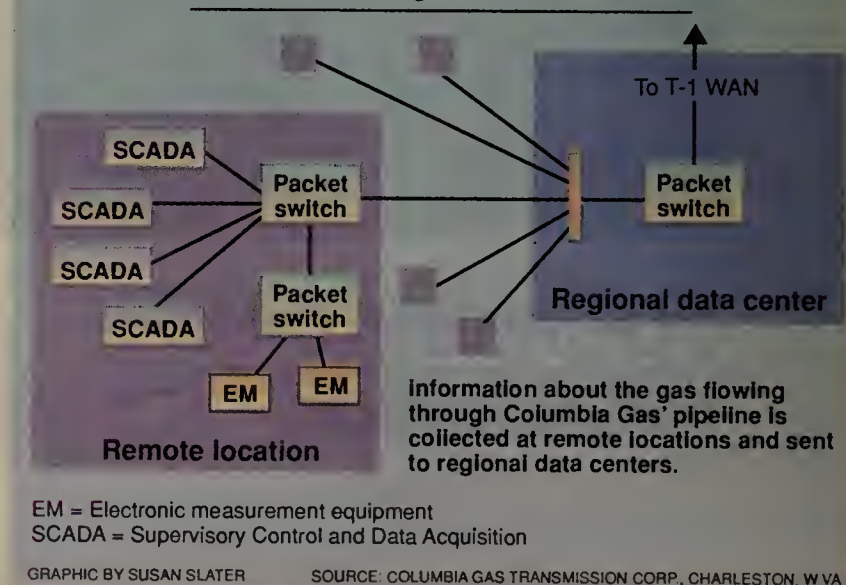
Information about the gas passing through the pipeline is collected by microprocessor-based measurement devices, called flow computers, which are used for both the SCADA and electronic measurement systems.

Flow computers used to collect information for SCADA purposes are located near pipeline valves and can open or close those valves to control the flow of gas. They can also be situated near long-term storage facilities where they monitor the amount of gas entering or leaving tanks. Flow computers used in the electronic measurement system are located at pipeline taps where customers draw off gas.

The flow computers are at-

Data collection in the field

Figure 2



EM = Electronic measurement equipment
SCADA = Supervisory Control and Data Acquisition

GRAPHIC BY SUSAN SLATER

SOURCE: COLUMBIA GAS TRANSMISSION CORP., CHARLESTON, W.VA

signed, we can lose any one Vitalink bridge and any one T-1 multiplexer without losing both Ethernet LANs at a site," Cavender says. "We've had zero outages in the last year."

Besides the zero downtime needed for the gas control operations, the redundancy in the net-

"We need a no-excuses network," Cavender says. "It cannot be out of service."

The SCADA network upgrade is essential for operating the pipeline. One of the more important aspects to the upgrade is the addition of the electronic measurement system.

The traditional way to measure gas in the field is to use meters with paper pens and disks that mechanically record the quantity of gas passing a point on the pipeline.

Because many measurement sites are in remote regions and unmanned, a worker must drive out to the site and retrieve the disk.

“We can reduce the amount of unaccounted gas,” Yeager says.

▲▲▲

Once the disk is returned to the office, it must be interpreted — a labor-intensive process requiring a person to measure the distance from the center of the disk to the pen line. The area enclosed by this line can be correlated to the volume of gas that passed through the pipeline.

This system has many deficiencies. Some of the remote sites are visited only once a week, so customers tapping that line don't receive timely information. The pen can also run out of ink sometimes and, without an attendant at the site, a week's worth of gas can go unrecorded.

The electronic measurement system solves these problems by using equipment that more accurately measures gas flow and can collect a wealth of information unavailable with paper disks. For instance, the devices can determine which grade of gas the customer is drawing off and calculate a bill based on the price of that grade.

“We can reduce the amount of unaccounted gas,” Yeager says, which will save the company money. “If it's unaccounted for, we gave it to somebody.” But the firm doesn't know who to charge.

Although the electronic measurement system seemed to be a great concept, it still had to be sold to upper management. This was accomplished primarily on the strength of the argument that it would provide better customer service and result in cost savings.

Columbia Gas officials declined to estimate how much money they expect to save. However, given the company's financial difficulties when this project was approved, it is probably safe to assume this \$14 million portion of the project has to have quantifiable savings and will pay for itself in a relatively short time.

After receiving the go-ahead last year, the upgrade's planners got the project off the ground and immediately turned to the cost

savings aspects. The electronic measurement system was designed to use X.25 and operate over a combination of leased and dial-up lines from the numerous local exchange and long-haul carriers in Columbia Gas' 15-state operating region.

Flow computers are now tied into regional packet switches via dial-up or leased lines. These packet switches are connected by trunk lines to the three data centers.

Cavender says using X.25 to tie the remote sites cuts the average monthly operating cost for each remote data acquisition site.

“X.25 public data network connections with Bell Atlantic [Corp.], Ameritech, Southwestern Bell [Corp.] and United Telephone Systems, Inc. are saving us conservatively 30% over our average data acquisition costs,” he says. “It costs about \$150 per month per remote site for X.25 communications costs. However, we are eagerly awaiting the introduction of ISDN services because the costs will drop to \$30 per month per site.”

In addition to low-cost communications, Columbia Gas planners also sought low-cost equipment. Equipment evaluations included not only the purchase price, but also the cost of equipment maintenance. Most of the equipment was going to be located in remote sites, so fixing a failed modem required considerably more effort than switching boxes in an equipment room.

The modems at the remote sites had to work under a wide range of operating temperatures, and they had to be low energy consumers. “The [measurement equipment] draws 1 watt of power,” says Rockie Brown, a network engineer at Columbia Gas.

“We had a devil of a time deciding what to put [in remote sites].”

▲▲▲

“When we said our modems drew 10 watts, the [design people] said, ‘argh.’”

The planners realized that it would be prudent to have diagnostic capabilities built into the communications field equipment. “We had a devil of a time deciding what to put [in the remote sites],” Brown says. “Regular dial-up modems would be a problem, [so] we decided to go with [CCITT] V.54 to get the diagnostics.”

The diagnostic testing (see “Diagnosing the network by remote control,” this page) will

help keep the costs of maintaining the remotely located equipment down because the networking staff can troubleshoot from a central location.

Columbia Gas chose a Universal Data Systems, Inc. model that was reengineered to meet the company's requirements. The 2,400 bit/sec modem consumes low power (1 watt), continues to operate under a wide temperature range and is compliant with the CCITT V.54 standard for loop-back diagnostic testing.

Besides saving on troubleshooting costs, Cavender says he believes additional savings will be realized in the way the company implements X.25 in the remote sites.

“We chose to go the software route and put X.25 into [read-only memory of the flow computers],” he says. The more tradi-

Quick access to information will help the utility be more competitive.

▲▲▲

tional way to set up an X.25 network is to connect the data collection device to an external packet assembler/disassembler.

Using software to do the same job as a PAD means Columbia Gas incurred a large onetime software development cost, but it will save money every time a remote station is added to the network because it will not have to buy an additional piece of hardware. “The software is a company asset,” Cavender says. “It can be ported to any platform.”

Looking beyond the costs

Quick access to information about gas in the pipeline will help the utility be more competitive.

The SCADA and electronic measurement networks will improve customer service, provide better inventory control and help reduce the company's billing cycle. Columbia Gas is banking on these networking benefits to help it get through its tough financial times, even though it is in an increasingly competitive industry.

In fact, the company considers the electronic measurement network so essential, there is talk that the project's scope may grow to include more locations than originally planned. Given the company's financial situation, the \$21 million that Columbia Gas has invested in its SCADA network upgrade and electronic measurement system installation shows how committed it is to using networking technology to save the business. ■

Diagnosing the network by remote control

The rugged hills of West Virginia, while beautiful, present a challenge to the networking staff at Columbia Gas Transmission Corp.

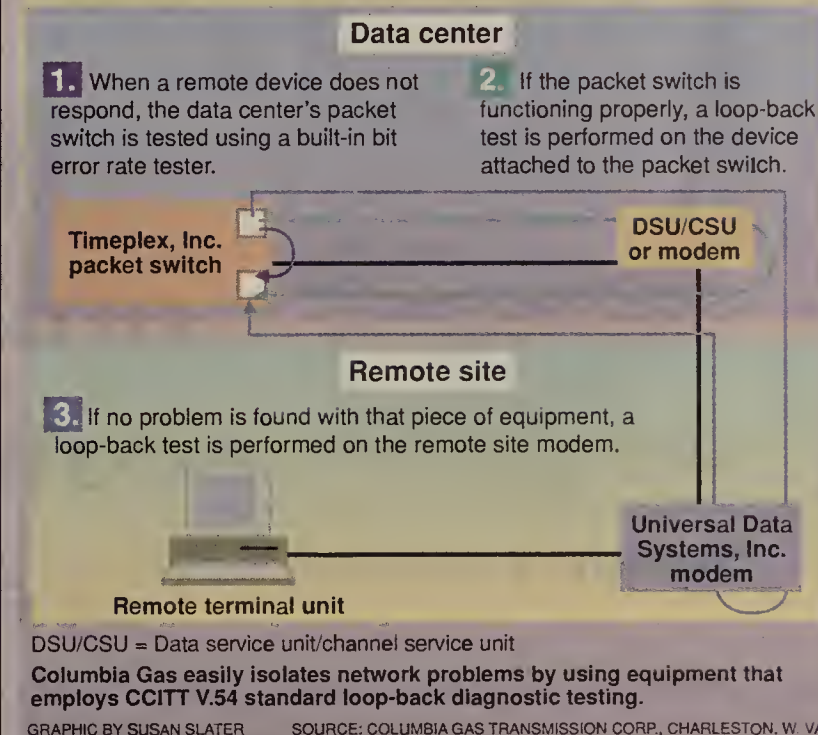
Much of the electronic measurement equipment the company uses to monitor the flow of natural gas through its pipeline is installed in unmanned pumping stations in remote areas. That means long drives for technicians whenever a piece of equipment fails.

To minimize labor costs and unnecessary trips, Columbia

does not respond when polled by a host computer, network staffers start to isolate the problem by performing an internal V.54 loop-back test, which informs them whether the packet switch is working properly.

If the packet switch is not causing the problem, staffers begin testing the local device — either a data service unit/channel service unit (DSU/CSU) with V.54 or a modem — on a circuit to a remote site. The test sends a signal from the packet switch to the local DSU/CSU or

Diagnostics made easy



Gas' networking staff can diagnose circuit and modem problems from a central site using CCITT V.54 loop-back tests.

“We wanted to avoid guys driving out to sites to look at lights on a modem,” says Bruce Cavender, the supervisory telecommunications network engineer at Columbia Gas.

By purchasing equipment that conforms to the V.54 standard, Columbia Gas can perform three tests that will help isolate a problem when equipment fails (see graphic, this page). These tests are conducted over Columbia Gas' X.25 network, which consists of Timeplex, Inc. packet switches. Timeplex offers low-cost equipment that complies with the V.54 standard and has a built-in bit error rate tester.

In addition, the utility installed Universal Data Systems, Inc. modems at remote sites because they offer low power consumption, can operate in a wide range of temperatures and can support V.54 diagnostics.

Using this combination of equipment, it is easy to diagnose a problem remotely, Cavender says. If a remote device

modem. If that signal comes back, the local DSU/CSU or modem is functioning, and a third test, called a remote digital loop-back (RDL), is performed.

The RDL sends a signal to the remote modem. In the event that the signal does not come back, there could be a problem with either the telephone line or the remote modem.

To determine if the problem is with the phone line in one of the 15 states where the utility operates, Columbia Gas personnel call the appropriate local exchange carrier to have the line checked.

If the RDL shows that the remote modem is working properly and the remote site is still not sending information, then the problem is probably with the remote data collection equipment, called a flow computer. “If we can loop our modem [at the far end], it might be a frozen flow computer,” Cavender says.

The flow computers are maintained by other departments, so none of the communications staffers would need to go into the field.

— Salvatore Salamone

These days, technology has to serve everybody. The trouble is, everyone wants technology to do something different.



IS managers, for instance, are apt to put

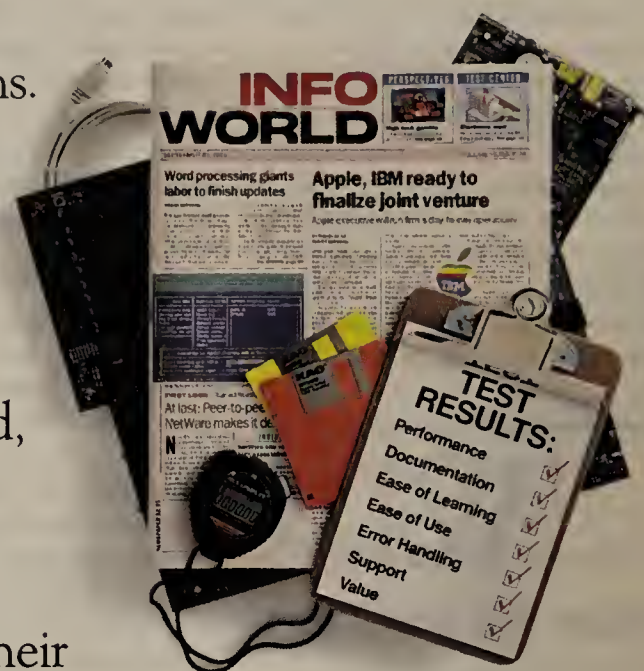
a very strategic spin on

things. That's because they're charged with

technology to produce the greatest business management gains.

Department managers, on the other hand, have to focus on doing just what their

name implies. So they're more concerned with the productivity issues in their own backyard,



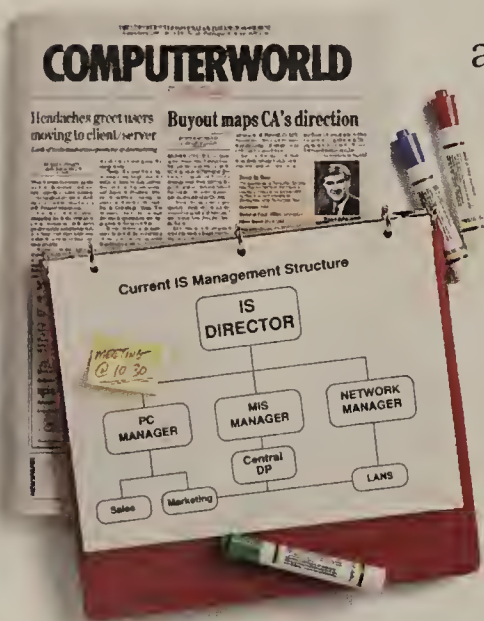
their local area networks, and generally making sure their department is happy and humming along.

End users, however, have a different perspective entirely. They see the

world from their desktop.

They want whatever helps them do

what they do better — while giving them access to the rest of the work-group or a mainframe.

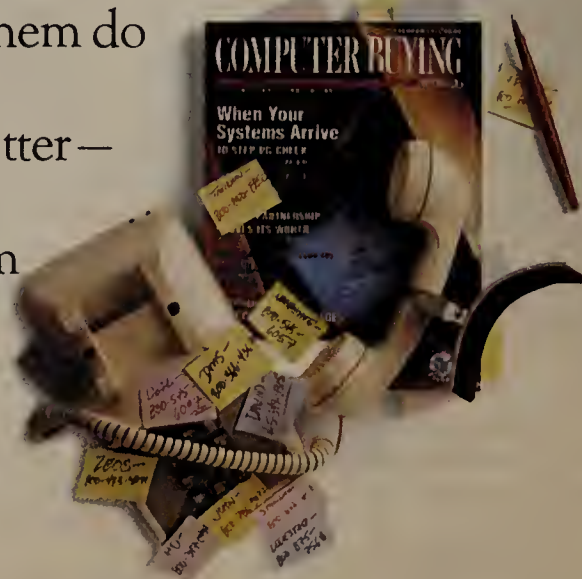
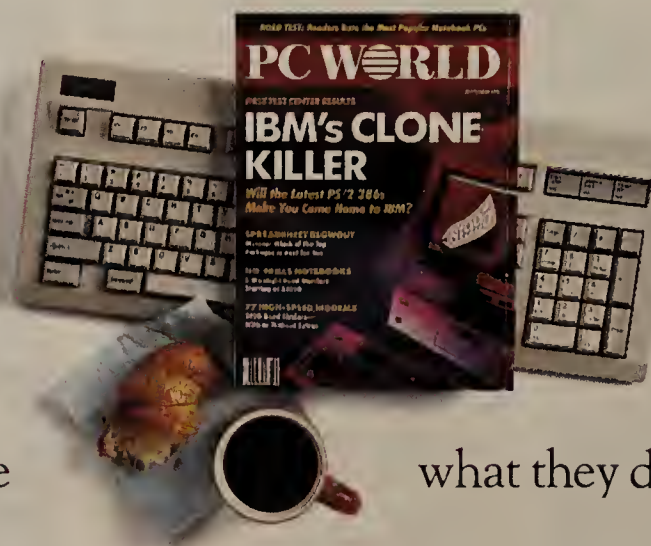


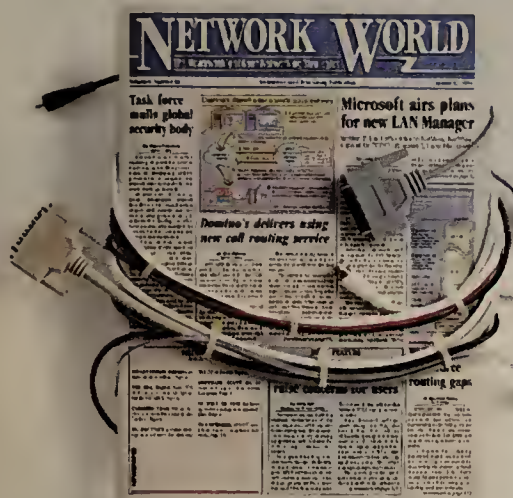
delivering information throughout the enterprise, integrating the company's computing and communications resources.

CIO's tend to look at the whole enterprise another way.

After all, they're tackling some of the very trickiest issues in business. Like how to best use

If there were only one kind of computer buyer, we'd only have one computer publication.





Then there's senior management. To them, technology is one of the best ways to gain a strategic,

competitive advantage. Or, at least, it better be.

The point is, everybody's involved. All these groups influence each other. That's why, today, there's no one person who's responsible for buying technology for the many. Instead, in the



networked corporation, there is a network of people who are responsible for buying and implementing technology, each responding to different needs and demands.



That's why they all need different kinds of information, presented in different ways, to help them do their jobs. And why

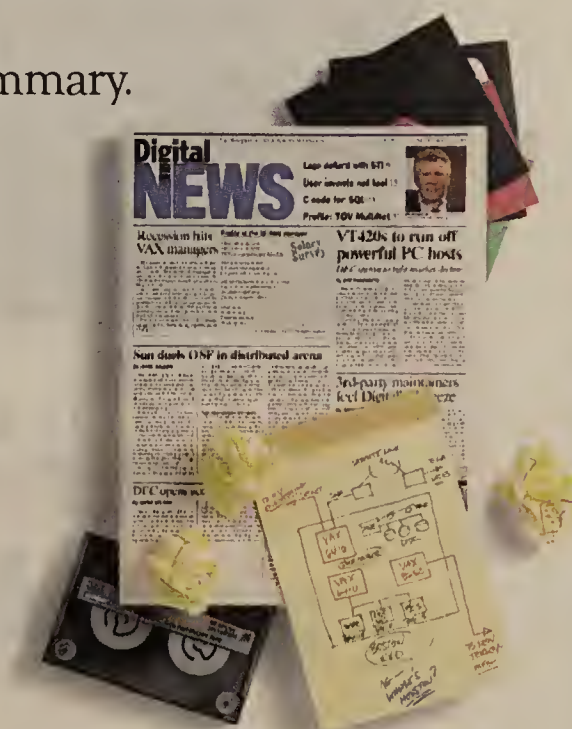
we have more than one kind of computer publication.

In fact, IDG has more ways to reach more of your market than anyone. We also know more than anyone about how information technology is bought, having just completed the largest independent study of the buying process ever conducted.



It's called, "Buying IT in the 90s: The People, Patterns, and Process." And we'd like to share it with you. Just call Erica Baccus, our V.P. of Marketing, at 1-617-534-1210, for a free copy of the Executive Summary.

And find out why nobody knows more about how to reach more of your market than we do.



IDG
INTERNATIONAL DATA GROUP

The World of Information Technology

© 1991 International Data Group, 1 Exeter Plaza, Boston, MA 02116, 1-617-534-1200.
Brand or product names are trademarks or registered trademarks of their respective holders.



TI's global net is instrument of success

By WAYNE ECKERSON



TEXAS
INSTRUMENTS



It's 8:30 a.m. About 20 staff members gather around a table in a dark conference room at Texas Instruments, Inc.'s Spring Creek facility in Plano, Texas, and begin evaluating the health of TI's vital corporate resources — its global network and information systems (IS).

While viewing a computerized log of the previous day's trouble tickets projected on a screen, members of the group discuss the cause and status of several minor circuit outages, as well as premises equip-

Eckerson is Network World's senior editor of management strategies.



PHOTOGRAPHY ©1991 STAN WOLENSKI

ment and data processing problems. The Texas group is joined by several network and IS staffers in Bedford, England, who are bridged by telephone and view a similar log on their workstations.

Today, as on most days, the meeting only lasts five minutes.

That's no small feat considering that TI, a \$6 billion multinational electronics giant that makes semiconductors, missile guidance systems and computer equipment, has hundreds of fiber, satellite, microwave and leased-line circuits crisscrossing the globe. The circuits link more than 60,000 workstations in 30 countries to one another and to 23 mainframes, which are housed primarily in twin data centers in Dallas and nearby Lewisville, Texas.

The meeting's brevity indicates just how close TI has come to achieving its goal of providing 100% network uptime and subsecond response time to TI locations throughout the world. Since 1987, TI's 170-person worldwide network staff has improved annual network availability from 99.05% to 99.64%, and it has no intention of slowing down.

This relentless pursuit of perfection is a major reason why TI has been named cowinner of *Network World's* 1991 User Excellence Award.

What drives TI's network staff to achieve this ambitious goal is a vigorous quality control program that stresses continuous improvement of network operations and commitment to meeting end-user needs as well as the understanding that the network is critical to TI's business success.

(continued on page 36)



*An enterprise network
that speeds product
delivery while achieving
near 100% reliability
gives Texas Instruments a
strategic edge.*



Pictured from left to right: George Chrisman, manager of electronic communications; Sam Shuler, communications strategy manager; Larry Proctor, manager of network services; and Gary Sprehe, manager of information systems.

The net spans 25 countries and enables users anywhere in the world to access applications running on mainframes in Dallas, transfer files to users on remote LANs, access files on remote

▲ ▲ ▲

The network gives TI a competitive advantage by allowing

"We ended up installing a lot of point-to-point connections between LANs, which quickly became costly and made our

For example, TI can receive an EDI order for a semiconductor

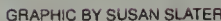
This close integration has en-

For example, TI was one of the first firms to use T-1 circuits in or-

"When we bring our requirements to vendors, they usually sit up and listen because they know we are usually 12 to 18 months ahead of most other users," Chrisman says. "We end up serving as an alpha- or beta-test site for many vendor products."

▲▲▲

"John White is one of the true visionary CIOs," says the former



SOURCE: TEXAS INSTRUMENTS, INC., DALLAS

TI sharpens its EDI edge

In the world of electronic data interchange, Texas Instruments, Inc. stands taller than a cowboy in a ten-gallon hat.

Few companies have as thoroughly integrated EDI into their business processes as TI. The statistics tell the story.

TI processes more than 11,000 EDI transactions a month with more than 1,700 EDI trading partners in 20 countries. The company subscribes to 16 value-added networks and uses almost every EDI standard in existence, including ANSI's X12 and the United Nations' EDI for Administration, Commerce and Transport (EDIFACT).

TI transmits more than 50 types of EDI business documents, such as purchase orders and invoices. Also, the company has built software interfaces that enable EDI transactions to be routed directly into 20 of its business applications, including purchasing, accounting and shipping.

Additionally, TI was named EDI user of the year by The Yankee Group, a Boston-based market research and consulting firm, and was recognized as having the largest cross-industry EDI program by EDI, spread the word!, a publishing and consulting group in Dallas.

But TI isn't content to rest on its EDI laurels. It's striving to transmit 100% of its orders electronically by persuading even its smallest suppliers to conduct business via EDI.

Currently, 65% of TI's orders to suppliers are handled via EDI, and more than half of the orders TI receives from customers are transmitted electronically.

Moreover, TI is using EDI to completely automate the purchasing function. Already, about 30% of TI's supply orders are handled without human intervention.

For example, TI employees order supplies by entering a requisition into TI's host-based procurement application from their terminals or workstations. The personal computer or host draws up a purchase order indicating the part, quantity and delivery date required. The procurement application then sends the purchase order via EDI to a supplier, which determines whether it can meet TI's requirements and then electronically sends an offer back to TI.

"The goal is to make EDI transparent to end users by embedding it in applications," says Ken Shoquist, manager of procurement and EDI systems at TI.

Shoquist says TI invested \$2 million during the mid-1980s to get its EDI staff and organization ready when the company began to ramp up its EDI effort. Today, TI uses 10 operations staffers to run its EDI program and an undisclosed number to develop new EDI capabilities.

The \$2 million figure does not include the costs of developing TI's EDI systems, which involves a centralized communications gateway to the outside world that handles all EDI and external electronic mail traffic, as well as TI's homegrown, rules-based translation software that converts applications data into EDI format for transmission to business partners. TI also spent additional money to develop an EDI management and audit system, and interfaces to internal systems.

But it's clear that TI is profiting from its EDI program both strategically and materially. Besides reducing administrative costs significantly and facilitating just-in-time manufacturing, EDI has become a revenue-generator in its own right for TI. This month, TI began marketing versions of its communications gateway, translation software and EDI management system for sale to other EDI users.

— Wayne Eckerson

net manager, a sentiment echoed by current TI staffers. "He encouraged us to try new things, and he set the highest standard for performance."

Currently, TI employees conduct more than eight million transactions over the network daily. Most of the network traffic flows to host processors in Dallas, which support a variety of customer service and business applications.

TI has standardized these applications throughout the company, so all personnel use the same general ledger, purchasing, shipping, inventory and other applications, regardless of their business unit or location.

"I can go to Miho, Japan, and sit in front of a terminal and run the same applications in the same way that I would run them here," Sprehe says. "We are committed to providing common applications to all users."

TI employees are also prodigious users of the company's 15-year-old, homegrown host-based E-mail system, sending close to one million messages a day.

The system delivers the E-mail messages within seconds, no matter where in the world the recipient is. Many TI employees use E-mail rather than a telephone and find it indispensable for conferring with colleagues in other time zones.

TI also uses an X.400 gateway to transmit E-mail messages to people outside the company.

In addition, engineers in TI's Defense Systems and Electronics Group as well as its Semiconductor Products Division are sending large computer-aided design files across the network right to shop floors, cutting days off the product development cycle. Previously, these design files were loaded onto magnetic tapes and shipped to manufacturing plants.

Currently, TI's backbone net-

work of the larger regional sites use IDNX muxes to consolidate traffic from that site to a hub.

The network supports voice, SNA terminal-to-host and peer-to-peer traffic between more than 125 LANs running such protocols as Digital Equipment Corp.'s DECnet, Novell, Inc.'s Internetwork Packet Exchange (IPX), Apple Computer, Inc.'s AppleTalk, the Transmission Control Protocol/Internet Protocol and Xerox Corp.'s Xerox Network Systems.

TI uses the CCM and CRM tests to check circuit availability and net response time.

▲▲▲

work comprises three main regional hubs in Bedford, Miho and Singapore that are linked via diversely routed pairs of T-1, 64K bit/sec undersea fiber or satellite links to its twin data centers.

The hubs consist of Network Equipment Technologies, Inc. (NET) IDNX multiplexers. TI sites within a region are linked to the major hubs using diversely routed fractional T-1, 64K bit/sec or lower speed circuits. Many

router or bridge is attached via an Ethernet segment to an Ungermann-Bass, Inc. Access/One concentrator, which supports one or more LANs.

Currently, TI supports almost every kind of LAN, including 4M bit/sec token-ring nets in its factories. But the firm is attempting to standardize on Ethernet (see "Centralizing support for diverse LANs," page 36).

Workstations on LANs that emulate IBM 3270 terminals can access a McDATA Corp. cluster controller attached to the Access/One. The controller feeds data to the nearest hub, which routes it to a host-attached front-end processor in one of the data centers.

Private branch exchanges at TI sites are connected to a T-1 mux, which routes voice calls between TI locations. The PBX also supports access to local and long-distance switched services for off-net calls.

The drive for quality

While the heady days of building a backbone network from scratch have passed, TI staffers are now intent on pioneering another frontier — quality. To that end, TI keeps comprehensive statistics on circuit availability, response time, line utilization and errors, which it reviews monthly with carriers. TI works with the carriers to achieve a level of performance that is above what is described in carrier tariffs.

During the early 1980s, TI devised an internal method to test all of its circuits continuously and a way to log circuit performance data in a host database called SAVAIL, which stands for system availability. TI developed software that enables one of its hosts to perform two tests on each SNA network circuit without NetView intervention at 10-minute intervals, 24 hours a day.

One test, the computer-to-computer monitor (CCM), measures the time required for a 200K-byte data file to travel from the Dallas mainframe to a remote processor and back again. The second test, the controller response monitor (CRM), clocks the time it takes for the same file to go from the Dallas host to terminal controllers on the network and back again.

TI uses the CCM and CRM tests to check both circuit availability and network response time. Results of the two tests are monitored in real time at TI's network control center in Dallas and recorded in the SAVAIL database, which tabulates daily, monthly and yearly averages for availability and response time. When acceptable parameters are exceeded, SAVAIL generates a trouble ticket and TI staffers tackle the problem until it's successfully resolved.

Once a month, TI holds a meeting with all its carriers — in the U.S., they include AT&T, MCI

Communications Corp., WilTel, Southwestern Bell Telephone Co. and GTE Communications Corp. — to review each of the trouble tickets that occurred during the previous 30 days. The purpose of the meeting is to determine whether there are any trends indicating problem areas that need to be pursued further.

"Carriers trust the accuracy of our statistics and will use them instead of their own internal measures to assess their performance," says Larry Proctor, TI's manager of network services.

TI also tells carriers how they stack up against one another. Proctor says he often shows carriers the availability figures TI collected by testing circuits leased from Japan's Nippon Telegraph and Telephone Corp. (NTT), which had only 12 minutes of downtime last year out of more than six million minutes total.

"[NTT] is the benchmark for [all] our [other] carriers," Proctor says.

“We try to find the point at which the equipment will fail,” Chrisman says.

▲▲▲

In March, TI established a separate quality program with AT&T, mainly as a result of the much publicized AT&T fiber cut in January that left TI without communications to Europe for almost seven hours, even though AT&T had supposedly provisioned TI with physically diverse T-1s from Dallas to London.

Now TI regularly reviews circuit routes with AT&T, and the carrier includes TI staffers when it discusses engineering new circuit paths. AT&T also informs TI before it will disable T-3 circuits for maintenance and has implemented a more vigorous escalation procedure so top-level AT&T executives are informed when a problem with a TI circuit has not been resolved within two hours.

Besides working diligently to improve carrier service, TI also puts all potential net equipment through a battery of tests designed to stress it to the limits before committing to a purchase. "We try to find the point at which the equipment will fail," Chrisman says.

Vendors whose equipment passes muster often become long-term TI suppliers. TI values the partnerships it has formed with various network equipment vendors, he says. TI tells the ven-

(continued on page 48)



The rest *These six outstanding*
of the best *companies earned*
honorable mention in
Network World's
User Excellence
Awards competition.

Copperweld Corp. of Pittsburgh

Central Fidelity Bank of Richmond, Va.

Covia Partnership of Englewood, Colo.

Teledyne Brown Engineering of Huntsville, Ala.

New York's Computer and Data Communications
Service Agency

U.S. Bureau of Export Administration of Washington, D.C.

With the steel market in an ebb, recession-depressed Copperweld Corp., a manufacturer of copper wire and mechanical and structural steel tubing, found a way to regain a competitive edge by building a network that improves customer service and product quality while reducing production costs.

Four years ago, Pittsburgh-based Copperweld had virtually no networking technology. Today, even employees on the factory floor can access corporatewide information using networked workstations, creating a faster and better managed

COPPERWELD

production process.

This strategic use of networking won Copperweld an honorable mention in *Network World's* Seventh Annual User Excellence Awards.

"We envisioned the network as the tool that would quickly get information to the people who needed it," says Jeffrey Pfeister, Copperweld's network supervisor.

To help in that effort, the new network plan called for revamping a computing environment that consisted largely of IBM 3270 terminals and 3827 printers at the company's six locations running proprietary Synchronous Data Link Control protocols back to a centralized Hitachi America, Ltd. 8053 mainframe.

This environment was replaced by a series of interconnected local-area networks that enable any workstation in the organization to access any other. In addition, Copperweld installed a computer-integrated manufacturing (CIM) system running both manufacturing and business

applications. This CIM system allowed the company to streamline manufacturing operations and meet customer demands more efficiently.

The network, which cost about \$1 million to implement, paid for itself within a year, according to Pfeister.

The CIM software runs on Tandem Computers, Inc. VLX minicomputers in two locations and is a third-party management resource planning package that was customized to better support the needs of Copperweld's process-type industry.

According to Pfeister, this online system allows customer requests for parts changes to be made immediately by down-

loading programs to workstations on the shop floor. Previously, this was a manual procedure that required a minimum of a week lead time before the shop floor received the proper information.

The system also enables the company to keep better track of its inventory — including raw materials, work in process and finished goods.

In the past, employees had to search through batch inventory reports in order to find out what was in stock.

Pfeister says that to his knowledge, few companies in the industry have networked workstations all the way down to the factory floor.

"The enterprise network and CIM software provide information immediately to people who need it," he says. "Real-time access to inventory data — along with engineering, scheduling, order and purchasing info — has helped us achieve our objectives."

— Maureen Molloy

Central Fidelity Bank knows how to stretch a dollar.

Last year, installation of a T-1 backbone network enabled the institution to maintain current network spending levels while increasing network reliability and adding new applications — including a check imaging application that provides more information about customers' account statements.

Central Fidelity is one of the few banks that is currently running a check-imaging application. The fact that it has implemented the application without increasing network spending earned Central Fidelity an honorable mention in *Network World's* User Excellence Awards.

"We didn't have to spend more than we [had] before," which is about \$1.3 million per year, says Jay McCullough, vice-president and telecommunications manager at the Richmond, Va.-based bank. "And reliability has gone from being a sporadic thing to almost 100% uptime."

The new network consists of 24 T-1 lines connecting 12 regional hub sites in a combination of star and ring topologies. Racal-Datcom, Inc. Omnimax 9000 T-1 multiplexers are collocated with a private branch exchange at each hub site, which enables all data circuits from branch locations to share the T-1 backbone with voice traffic.

A Racal-Datcom NMS 9000 network management system is located at each of the bank's primary data centers in Richmond and Lynchburg, Va., to provide redundant network management around the clock.

These redundant network

management systems enable Central Fidelity to support its new check-imaging application. The application takes images of checks processed at the bank's 201 statewide branches and downloads them to the data center in Richmond for incorporation into customers' account statements.

Without the new network, the bank would have had to purchase three additional T-1 links to accommodate the application.

The network management system enables the bank to deactivate at night all nonessential channels, such as for voice, and turn the bandwidth over to image transmission.

The network is a big improvement over the bank's previous setup, which consisted of separate T-1 circuits for voice, automated teller machines, customer service mainframe applications and a lower speed circuit for its Trust Department application. Circuits on each network were underutilized, and each network had incompatible management systems.

"We were paying \$5,000 [a month] for each point-to-point T-1 link," McCullough says.

Although all four networks were using basically the same route, none were able to utilize enough bandwidth to justify the T-1 links they were using.

"By purchasing the [T-1] multiplexers and putting in the network that we did, everybody's riding the same channel," McCullough says. "And we have the flexibility so that if a channel goes down, there are alternate routes going to the same location."

— Joanne Cummings

Central Fidelity

Managing a worldwide network that spans 42 countries can be a daunting task under the best of conditions. But when it includes monitoring links to numerous networks owned by other companies, the chore becomes that much more complicated.

Covia Partnership, which is

COVIA

owned by a group of airlines and runs the Apollo computer reservation network, is solving that problem with its Intelligent Link Manager (ILM), an internally developed network monitoring, management and expert system.

ILM helps its users quickly diagnose, resolve and even avoid problems associated with the links between Apollo and networks owned by the various airlines, hotels, car rental agencies and other related companies. That helps keep the network up and running, thereby increasing revenue for Covia and winning it an honorable mention in the User Excellence Awards.

"It increases employee productivity and effectiveness in the areas they monitor," says Greg Arbon, senior knowledge engineer with Covia's artificial intelligence and expert systems group in Englewood, Colo. "Obviously, that has an effect on profits. If we can keep our network up and running more consistently, that in-

creases our revenue."

ILM is software that runs under OS/2 on an IBM Personal System/2. It includes separate distinct processes — database, graphical user interface (GUI), core processing and an expert system — that communicate as necessary to help the staff charged with monitoring Covia's network identify and respond to network problems faster.

The PS/2 running ILM is attached to a mainframe and works with a Covia-developed host application. This application facilitates communications between Apollo and other nets and deter-

"If we can keep our network running more consistently, that increases our revenue."

▲▲▲

mines the health of the various internetwork links. It also produces status and diagnostic messages that are collected by ILM.

The system's core processing module monitors the messages and checks each one against a fil-

ter that can invoke user-written scripts. These scripts issue the commands necessary to automatically respond to many routine and redundant messages.

ILM's expert system component provides recommendations for how users can solve more complicated network problems. It employs a knowledge base that takes into account the current state of the network's conditions, historical data, the condition of related nodes and the time of day. Future enhancements include a capability that will allow it to automatically correct these more complicated network problems.

ILM's database stores historical data on net performance and conditions. The database is currently used to generate reports that help users identify patterns, and Covia plans to enhance the database with a trend analysis component that will help proactively identify potential network trouble spots, according to Arbon.

The GUI enables users to easily control which status and diagnostic messages should appear on the console and to change the configuration according to the time of day.

"A system like that gives [users] a tremendous amount of power," Arbon says. "You have to allow your users to be the experts. If you limit the system, you limit their ability to perform their job."

— Paul Desmond

This year, Teledyne Brown Engineering launched a major effort to overhaul its network operations in response to a new corporate quality improvement program.

By interconnecting four previ-

TELEDYNE BROWN ENGINEERING

ously separate Ethernet networks spread across its 10-building campus, Huntsville, Ala.-based Teledyne is improving the response time of its network support staff while reducing costs and improving communications companywide.

These achievements have earned Teledyne an honorable mention in *Network World's* User Excellence Awards.

"During 1990, we had a cross-functional team in charge of identifying where the company could improve its automated processes," says Don Zana, Teledyne's director of computer resources and technology. "It was determined that the network area would have the highest payback if it were improved."

When it interconnected its Ethernets — which support a total of 2,000 computers — with Cisco Systems, Inc. routers, Teledyne also merged its network support staffs to form a unified

network integration staff of eight employees. This staff is also responsible for wide-area links to a Teledyne customer at the National Aeronautics and Space Administration, the Alabama Supercomputer Center, two Teledyne partner companies and various field offices.

Teledyne plans to develop a protocol expert for each of its four strategic protocols: Open Systems Interconnection, Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet and Apple Computer, Inc.'s AppleTalk, Zana says.

Interconnecting the Ethernets has also enabled the company to trim the cost of its network operations. For example, because of the Ethernet linkage, Teledyne is moving toward implementing a centralized network management system, rather than supporting a separate management system for each network, he says.

The company has already acquired a network management system consisting of DECstation 3100 hardware and DEC Management Control Center Director software and plans to implement the system by February.

"This [will be] one of the real cost savings for us," Zana says.

The network interconnection

has also facilitated work group and interpersonal communications across different departments throughout the company, including the exchange of computer-aided design files and electronic mail, Zana says. Teledyne previously relied on "sneaker-net" to provide communications among divisions.

Teledyne plans to have a Touch Communications, Inc. WorldTalk X.400 gateway in place by year end to link multiple vendors' E-mail systems throughout the firm, Zana says. The company is also looking to migrate to

Teledyne is improving response time of its staff.

▲▲▲

a Fiber Distributed Data Interface backbone in order to link its Ethernets.

Also, Teledyne plans to obtain new routers and FDDI modules for its existing Cisco routers in order to tie its Ethernets into an existing fiber cable, Zana adds.

— Bob Brown

Other innovative network users

While forward-thinking network managers at large corporations are using network technology to gain a strategic edge, others are employing it to pursue socially responsible goals or simply to improve communications between customers.

Although they did not win a User Excellence Award, these managers nonetheless deserve credit.

Some are using net technology for exchange of info.

▲▲▲

Take the nonprofit Literacy Volunteers of America-New York State, Inc. (LVA-NYS), for example. The growing nationwide effort to combat adult illiteracy has sent demand for general education information and data on pending legislation skyward.

With funding from the New York State Education Department and Apple Computer, Inc., LVA-NYS developed a commercial bulletin board system operated by Online America, Inc. of Vienna, Va. Program managers at 53 New York affiliate offices can use DOS, Macintosh or Apple II personal computers and free software provided by Online America to access the bulletin board via BT Tymnet, Inc. or Sprint Data Group's packet networks.

Once on-line, program managers can learn about grant opportunities, work together on public relations activities, keep abreast of pending adult education legislation and share training ideas, lesson outlines and materials.

"Program managers can now either post or pull off adult education information," says Chip Carlin, LVA-NYS' information services and technology director. In the past, this information was only available via mail.

LVA-NYS is not the only nonprofit group using network technology to gather or provide easy access to critical data.

Recently, the U.S. Department of Agriculture used networking to collect information about a simulated disease outbreak.

Instead of providing terminal-to-host access to a centralized computer system, the Agri-

culture Department decided to let users on a series of local-area networks running Microsoft Corp.'s LAN Manager access a centralized server running Oracle Corp. database management system software.

The new approach has enabled staff at far-flung sites to enter and retrieve information simultaneously. Benefits realized from the LAN-based system include a 100% to 200% increase in data entry efficiency over the previously used centralized database, the ability to use existing computer resources, and current and timely data on the disease outbreak status, says Tim Dye, information systems support staff chief for the Agriculture Department.

While some groups are using network technology to encourage the free exchange of information and to promote academic interests, others are using nets to change the way they do business.

The Boston Computer Exchange has deployed an on-line network database of available used computers that enables

Others are using nets to change how they do business.

▲▲▲

buyers and sellers to meet in a real-time market.

"We are transforming a mundane domain of business into an exciting new approach to [conducting] business," says Alex Randall, president of the Boston Computer Exchange.

The exchange's system is built on an Ethernet LAN running Banyan Systems, Inc.'s VINES operating system. File servers are located at the exchange's headquarters in Boston and at the office of Inacom, Inc., a key Boston Computer Exchange business partner based in Omaha, Neb. The two offices are linked by a T-1 line.

The exchange provides instant answers to questions about used computer availability, pricing and location, Randall says.

Authorized members of the exchange can dial directly into the database in Omaha or dial into the Boston office and access it over the T-1 line.

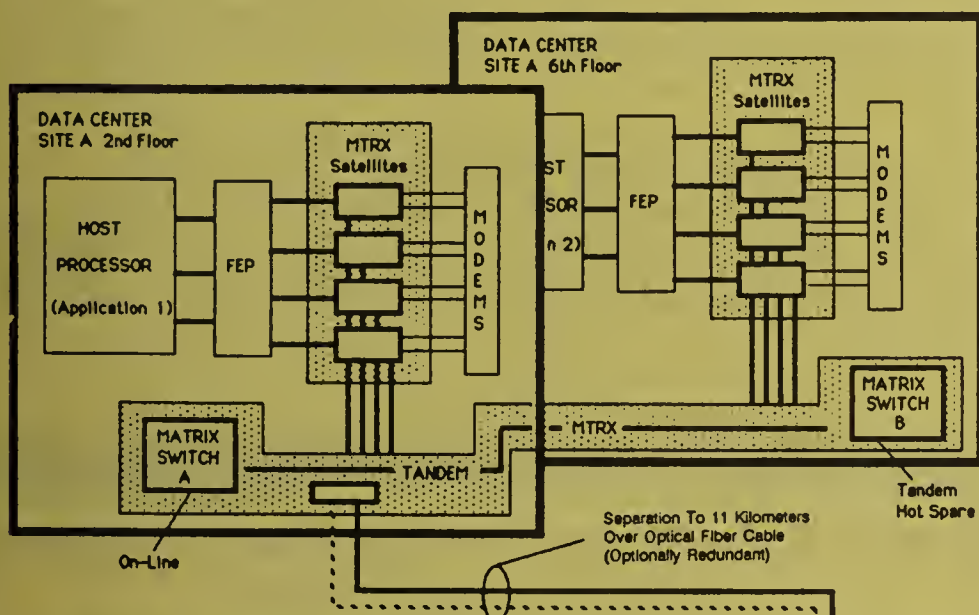
— Bob Wallace

DATA COMM MATRIX SWITCH

3-WAY DISASTER PROTECTION

WITH THE MTRX TANDEM MATRIX SWITCH

- 1 Separate MTRX Assemblies in different parts of your building or even different buildings
- 2 Distribute MTRX Satellites up to 22 Kilometers from each other
- 3 Diversify MTRX Satellite connections to the MTRX Tandem Matrix Switch Assemblies over dual, diversely routed Twisted Pair or Optical Fiber Cables

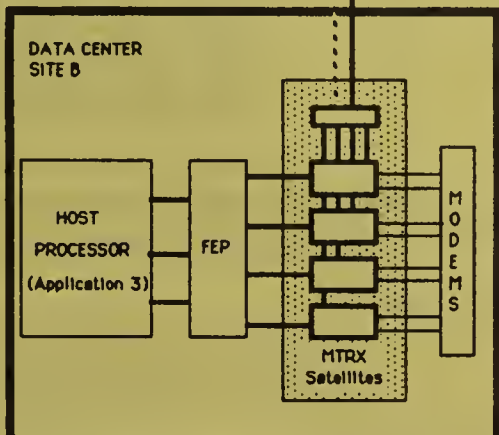


APPLICATION RESTORATION SCENARIO

- On-Line Application 3 Failure at Data Center Site B 11 Km From Site A
- Bring Up Application 3 on the Host at Data Center Site A
- Use the MTRX to Connect the Site B Modems to Application 3 now running on the Host at Site A
- On-Line Application 3 Quickly Restored

DISASTER RECOVERY SCENARIO

- Experience a Major Power Failure at Data Center Site A, 2nd Floor (including MTRX Tandem Matrix Switch A)
- Automatically the MTRX transfers control to the Tandem Matrix Switch B Located on the 6th Floor
- Continue To Manage the Rest of Your Network at Site A and Site B



Over 80,000 Ports Installed At RBOCs, Government, and Fortune 1000 Companies

Call us Today to Discover the **NEW DIMENSIONS** in Network Management Technology With the **MTRX** Family of **TANDEM** Electronic Matrix Switches



Datacomm
Management
Sciences Inc.

"The Responsive Ones"

25 Van Zant Street
East Norwalk, CT 06855
TEL: (203) 838-7183

Circle Reader Service No. 1

4 TO 64 PORT STAT MUX

Multiplexer Breakthrough

"Our company was wasting \$44,000 a year without DATA RACE's 4-64 port Mux!"
— MIS Manager

**Feature-packed
64-Port Stat Mux in
less than 1.5 cubic feet**



Circle Reader Service No. 4

Amazing NEW digital switching multiplexer from DATA RACE sets new price/performance standards.

Do remote users need to access your mini mainframe or LAN? You can save up to \$6,000 a year per user on operating costs with DATA RACE's new MACH DS 64 Multiplexer. Just 5 of 12 breakthrough features:

1. Lowest Per Port Cost in the Industry
2. Second Link Dial Standby
3. Multiple Analog AND Digital Link Support
4. No Compromise Tail Circuits
5. Nationwide On-site Service

FREE 12-pg. Network Applications and Product Catalog.

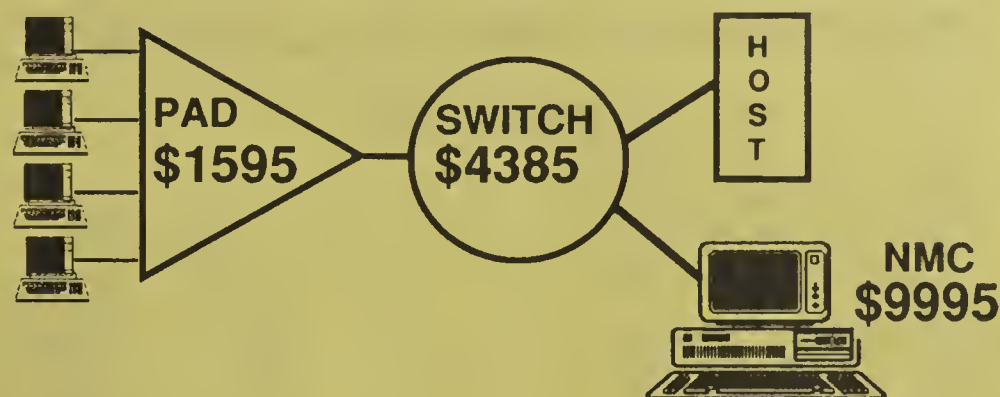
Call 1 800 999-7223

DATA RACE

11550 IH 10 West San Antonio, Texas 78230

X.25 NETWORK CONNECTIVITY

OST'S X.25 CONNECTION: SAVES \$\$\$



PAD FEATURES:

- Full support for CCITT (1984) X.25, X.3, X.28, X.29.
- Expandable up to 16 asynchronous ports, offering a per port cost of only \$193.
- No loss of configuration with loss of power.

SWITCH FEATURES:

- Multiple protocol support: 1984 CCITT X.25, X.32, X.3, X.28, X.29, SNA/SDLC, VIP & BSC with line speeds up to 64 kbps.
- Expandable up to 18 ports, offering a per port cost of only \$446.
- Battery backed-up line and routing configurations when loss of power is encountered.

NETWORK MANAGEMENT FEATURES:

- Graphic network display and statistics package.
- Management of configurations and software with support of up to 50 nodes.
- 386PC Inclusive.

SUPPORT:

- Free 1 year warranty service providing 24 hours a day, 7 days a week customer service.



NETWORKING INTELLIGENCE

For further information write or call:

OST, Inc.
14225 Sullyfield Circle
Chantilly, VA 22021

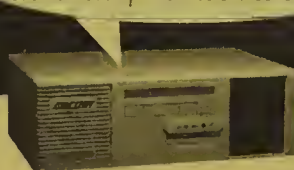
Tel: (703) 817-0400
FAX: (703) 817-0402
Modem: (703) 817-0456, 2400 Bps;
(703) 817-9846, 9600 Bps, 8A1(N)

Circle Reader Service No. 2

DATA/VOICE NETWORKING EQUIPMENT

ONE TALKS. THE OTHER EMBEZZLES.

I can combine voice, data, fax and LAN over low-cost phone lines and save money.



Time was, the old stat mux was the best way to save money. Those days are gone. Your data-only multiplexer is costing you lost savings every day you use it.

For about the same price as a stat mux, you can now buy a data/voice network server able to combine remote voice, data, fax and LAN traffic over one low-cost leased line at speeds from 9.6K to 56/64 Kbps. It's called Marathon 1K and it's a breakthrough in technology and fast payback. Using the same private line for voice and fax as well as data and LAN traffic can save big bucks month after

month on phone company toll charges. So Marathon 1K can pay for itself in just a few months, and after that all the savings go to your company's bottom line.

Products that don't save your company money are no more than profit robbers. Get Marathon instead. Call for a free compressed voice demonstration or attend a Data/Voice Integration Workshop. Call toll-free (800) MICOM US (642-6687) or (805) 583-8600. Fax (805) 583-1997. Canada: (800) 932-DVNS. Call MICOM today and stop wasting money.

MICOM

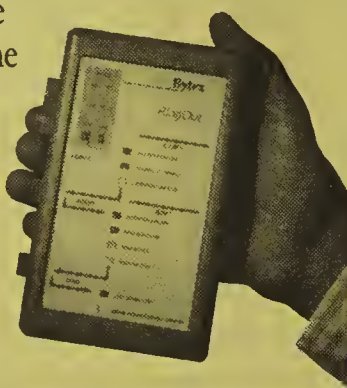
Circle Reader Service No. 3

DIAGNOSTIC TEST EQUIPMENT

Get your hands on the most comprehensive Token Ring cable tester for only \$1495.

Introducing the Bytex RingOut cable tester—the first designed specifically for Token Ring. And the easiest-to-use. ■ Tests 4 and 16 Mbps STP and UTP LANs. ■ Detects damaged or improperly installed cables or connectors. ■ Confirms correct operation of MSAU. ■ Detects and isolates beaconing nodes. ■ Works on live LANs—no shutdown required. Find out about our 30-day money back guarantee.

Call 1-800-23-BYTEX for details now.



Bytex

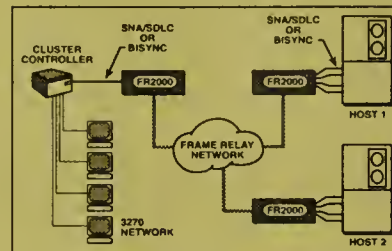
Bytex is a registered trademark of Bytex Corp.

Circle Reader Service No. 15

FRAME RELAY ACCESS

3270 USERS GET FRAME RELAY NOW

The new FR 2000 Frame Relay Terminal Adapter enables existing SNA/SDLC and Bismac environments to access frame relay networks.



With the FR 2000 you can start small and grow as your applications dictate. Operating at speeds up to 64 Kbps, the FR 2000 can support as many as 40 terminal devices, all while

maintaining compliance with Frame Relay Forum standards. Find out more. Call 1-800-777-4005.

It's a compact, economical device that allows you to derive frame relay benefits without major financial or operational risks.

General DataComm

WORLD CLASS NETWORKING

WORLD HEADQUARTERS 1-203-574-1118 HONG KONG 852-526-5511 CANADA 1-416-498-5100 AUSTRALIA 61-2-956-3099 UNITED KINGDOM 44-734-774868 EUROPE, AFRICA, MIDDLE EAST HEADQUARTERS 33-1-30570200 JAPAN 81-33-862-1730

Circle Reader Service No. 20

DIAL-UP MANAGEMENT

Optimize Dial-up Modem Network Utilization



With CDI's Patented Network Windows™ Management System

CDI's PC based Dial-up Modem Network Management System has been field proven worldwide since 1983. Reduce your line costs and prevent client loss with these features:

- Modem vendor independent-works with any modem type
- Provides local reconfiguration from the keyboard
- Generates complete daily usage and error reports
- Automatic busy of "ring no answer"
- Central site management of a distributed network
- UL approved

Circle Reader Service No. 16

CDI - The Answer To Dial-Up Modem Management
Call or Write For Information & Demo Disk

Communication Devices Inc. • 1 Forstmann Ct. • Clifton, NJ 07011
Phone 201/772-6997 • Fax 201/772-0747 • 800/359-8561

CDI

LAN

Tired of LANs Giving You The Silent Treatment?

Get Them Communicating With

HARRIS ADACOM

Complete Token-Ring Solutions!

* Cabling Solutions:

MAUs, Media Filters, Repeaters

* Bridges:

Local, Token-Ring, Ethernet
Remote, Token-Ring, Ethernet, SNA, 56K, T1

* Gateways:

Ethernet, SNA, TCP/IP, Token-Ring, Unix
Local and Remote

* FDDI

For answers to your connectivity needs, call

HARRIS ADACOM

1-800-3270-ADA

Circle Reader Service No. 17

MULTICONDUCTOR CABLES

Free product and service information is right at your fingertips!

Network World's ActionCenter makes it easy for you to get the free information you need on products and services that can make a difference to your organization.

- * Use the Reader Service coupon in *Network World*.
- * Circle the Reader Service numbers that correspond to the advertisements in ActionCenter.
- * Fill out the coupon and send it to:

Network World
P.O. Box 5090, Pittsfield, MA 01203

And the information you want will soon be on its way to you!

The sooner you return the coupon, the sooner you'll have the information you need to make informed purchase decisions.

System Conductors.

Wise Components can quickly supply a variety of General Cable/Guardian PVC and plenum multiconductor cables for a multitude of systems.

Available from stock, 12- to 22-gauge unshielded cables have up to 50 conductors. They're ideal for public address, unbalanced intercom and low-voltage relay control systems, plus remote control circuits, telephones and interconnecting cables.

Guardian 12- to 24-gauge shielded cables also have up to 50 conductors. Designed for EIA RS-232 applications, they're perfect for intercom, audio, signal and multiple speaker systems; also remote control circuits.

Conduct your system to perfection. Call Wise now for perfection in superior service.



WISE COMPONENTS, INC.

28 Henry Street
Greenwich, Conn. 06830

800 543 4333

In Conn. 800 852 8557

Fax: 203 531 4859



Circle Reader Service No. 18

MULTILINE DSU/CSU'S

TODAY YOUR APPLICATIONS DEMAND MUCH MORE FROM YOUR T1 DSU/CSU

Introducing the Connect1 Plus from **VERILINK**

**More Performance, More Flexibility,
More Advantages** including:

- * Access to T1, Fractional T1 and Virtual Private Networks
- * Drop and Insert
- * 2 Ports Expandable to 6
- * Supports up to two T1 lines
- * Continuous, Full Network T1 Performance Monitoring
- * Network Management

Call Us Today Toll-Free at

1-800-669-4278

For Your **FREE** Verilink Planning Kit



The Helfrich Company
19782 MacArthur Blvd, Suite 310
Irvine, CA 92715



Circle Reader Service No. 11

PC BASED PROTOCOL ANALYZER

PC Based 9415 Protocol Analyzers

- Processor based for 256 kbps performance. **Available in full and 1/2 card lengths.**
- Statistical multitasking monitor with simultaneous data, decode, and statistics displays.
- SNA/X25/ASYNC/BISYNC decodes and statistics standard.
- User friendly 9400 interface.
- G.821 BERT standard.
- Compatible with all 9400 dedicated analyzers.



GNI Navtel

6611 Bay Circle, suite190, Norcross, GA 30071

Call Toll free in the USA: 1-800-262-8835 Fax: (404) 446-2730

Circle Reader Service No. 12

NETWORK DESIGN

FREE Network Design Software

CONNECTIONS is pleased to offer a free copy of its NodeLocator software which identifies the best sites for concentrators based on costs and traffic volumes.

For your free copy of NodeLocator call, write or FAX.

This offer is to introduce you to the full line of network design products and services from CONNECTIONS:

- PC based software for backbone, peer to peer and SNA WAN's
- Consulting support in strategic and tactical networking issues
- Tariff services and online database for pricing and research

Connections

Thousands of corporate data networks have been optimized using Connections products and services.

Connections Telecommunications, Inc 375 Westgate Drive Brockton, Ma 02401
Phone (508) 584-8885 FAX (508) 583-6219

Circle Reader Service No. 10

PC BASED PROTOCOL ANALYZER

PC-based performance and protocol analysis that's as easy as pie.



The PA1 combines performance analysis with protocol analysis to help you diagnose problems and plan network evolution. Sophisticated histograms, pie charts and line graphs help you track performance parameters.

For protocol analysis, you can display layer 2 and layer 3 data for SNA, X.25, and QLLC.

Call us at (708) 574-3399.

Progressive Computing

Progressive Computing, Inc.
814 Commerce Drive
Oak Brook, IL 60521

Circle Reader Service No. 13

NETWORK MANAGEMENT

AUTOMATIC

NETWORK MONITOR & CONTROL

\$ 795

Remote System Diagnostics and Management with Eight or 16 Alarm and Control Points. Dataprobe's NEW Mini-MAC or SYMON-8. Send for Complete Details.



170 Coolidge Avenue / Englewood, NJ 07631
Phone: (201) 569-6464 Fax: (201) 894-0939
Circle Reader Service No.

Circle Reader Service No. 14

Send For Free Info

NW Nov 91

For more information on any of the products and services advertised in *NetworkWorld's ActionCenter*, circle the Reader Service Numbers on this coupon which correspond to the advertisement of interest to you.

Complete the coupon information and mail to:

NetworkWorld

P.O. Box 5090, Pittsfield, MA 01203

Expires 2/29/92

Name _____	1 2 3 4 5 6 7 8 9
Title _____	10 11 12 13 14 15 16 17
Company _____	18 19 20 21 22 23 24 25
Phone () _____	26 27 28 29 30 31 32 33
Street _____	34 35 36 37 38 39 40 41
City _____	42 43 44 45 46 47 48 49
State _____ Zip _____	50 51 52 53 54 55 56 57

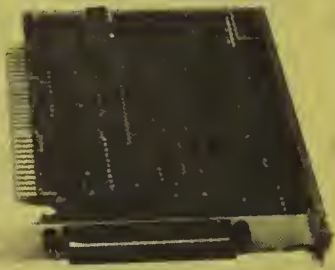
NW Nov 91

PROTOCOL ANALYZER

Omni I/O™ PC Based Protocol Analyzer

FREE DEMO DISC

- Fast, friendly user interface. Excellent data visibility.
- Integrated data capture, analysis, DOS file storage. Named configurations, formatted print.
- Async, Sync, BOP's (SDLC, X.25, etc.), Transparent, ASCII, EBCDIC, IPARS, user defined.
- Fits PC, AT compatible, 386 and Laptop with standard bus and CGA, EGA or VGA.
- Programmable- API for unprecedented power and flexibility.



COMPUTRONICS

Circle Reader Service No. 21

Romney, WV

FAX 304-822-4508

P.O. Box 2040, 151-C Jersey Mt. Road, Romney, WV 26757 • 304-822-3086

PROTOCOL ANALYZER

Introducing... A Powerful Protocol Analyzer in a PC



The AR INTERVIEW® 72 sets new standards in flexibility and value for protocol analyzers. Available pre-installed in a full-color or monochrome laptop or as a card kit that can be installed in just about any AT-compatible PC, the INTERVIEW 72 puts the power of an AR protocol analyzer into a PC.

Features include:

- X.25, SNA, BSC and Async
- Real-time data capture, trace, statistics, and emulation
- RS-232 and V.35 interfaces
- Automonitor
- Remote control capability

For more information, call or write today.

1-800-368-3261

Circle Reader Service No. 22

TELENEX
CORPORATION
A UNIT OF GENERAL SIGNAL

AR Test Systems
7401 Boston Boulevard
Springfield, Virginia 22153
Phone: 703-644-9190 • Fax: 703-644-2507

PROTOCOL CONVERTER

AGILE COAX CONNECTIONS

PC/LAN

MAINFRAME

6287 ULTRA

- flagship product
- thousands installed
- alternate host
- protocol conversion
- printing enhancement

6287 IIISi

- HP IIISi-Specific
- connects to MIO port
- alternate host
- APL support

6287 ALLY

- highest speed (up to 100 PPM)
- small footprint
- ROM cartridge
- easy upgrade, programmability

ASCII/EBCDIC PRINTER

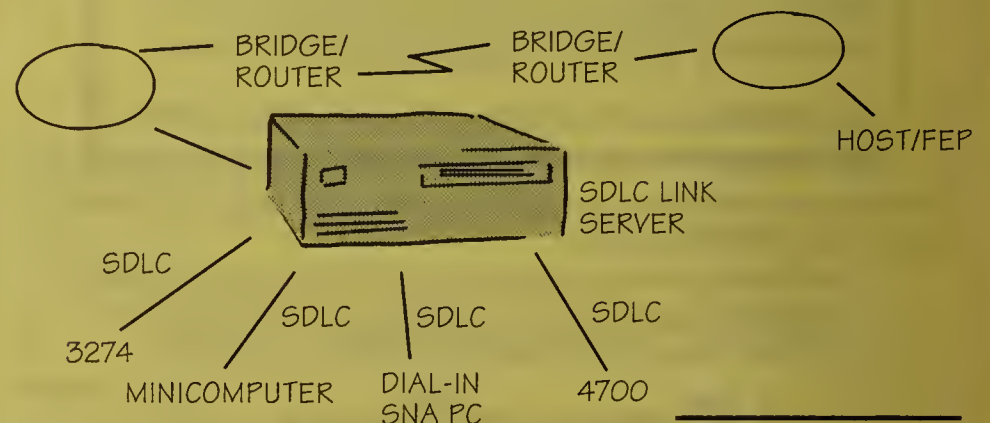
AGILE

825 ALFRED NOBEL DRIVE • HERCULES, CA • 94547-1899
(510) 724-1600 • (800) 538-1634 • FAX: (510) 724-9624

Circle Reader Service No. 25

SNA INTERNETWORKING

Connect SNA/SDLC Devices To LAN/WAN Internetworks



With SDLC Link Server, transport SNA data across your internetwork. Eliminate parallel networks...Reduce costs...Improve response times...Support PU Type 2.0 and 2.1 devices...Leased or dial-up connections...With full NetView visibility!

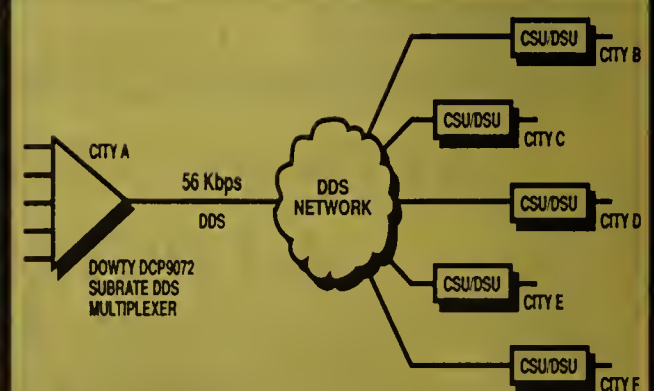
Circle Reader Service No. 23

NETLINK
INC.

Call
1-800-NETLINK
Today!

SUBRATE DDS MULTIPLEXER

Look what
you can
do with
Subrate DDS!



With the new Subrate DDS Multiplexer from Dowty Communications, data channels can be routed to different destinations via the DDS network. You save on line costs and there's no need for multiplexers at the remote sites.

The new DCP9072 Subrate DDS Multiplexer also includes a built-in CSU/DSU. It accommodates up to five synchronous inputs at an aggregate data rate of up to 48 Kbps. The inputs may operate at 2.4, 4.8, 9.6, 19.2, 28.8 and 38.4 Kbps.

For more information on the Dowty DCP9072 and on our worldwide support team, call 800-227-3134 or write Dowty Communications, Cherry Hill Industrial Center, Cherry Hill, New Jersey, 08003.

Dowty Communications
Formerly CASE/Datatel



Circle Reader Service No. 24

Your Key to Target Marketing



The Network World Subscriber List

Over 300 selection options...

- The key to better selectivity
- The key to prequalifying your list
- The key to a better return on your investment
- The key to a successful direct mail campaign

Call 800-343-6474, x202 for details

IDG Communications List Services

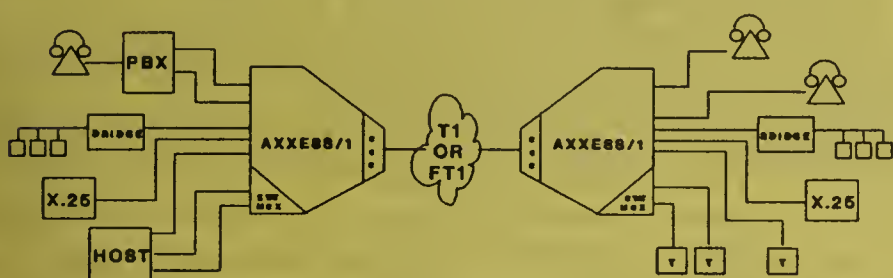
NETWORK WORLD

T-1/FRACTIONAL T-1 MULTIPLEXER

T1/FRACTIONAL T1 TDM

FREE BANDWIDTH!

- 99% Efficient TDM
- Integral Statistical Multiplexer
- Quality Compressed Voice



Call 800-243-4485 or 203-265-7151 for details and local distributor

Dataproducs New England

50 Barnes Park North, Wallingford, CT 06492

Over 7,000 Multiplexers Shipped

Circle Reader Service No. 5

TC 1000 PROTOCOL ANALYZER

The TC 1000 Protocol Analyzer

The TC 1000 from Telecommunications Techniques Corp. (TTC) gives you quick answers to your data network protocol and performance questions.

- Easy-to-use Scripter and Auto Configuration provide a fast path to test set up.
- Flexible Layer 2 and Layer 3 full "English" decodes coupled with a large screen for side-by-side display provide quick problem determination.
- Protocol Analysis
 - SNA
 - X.25
 - Primary Rate ISDN
- Data Interfaces
 - RS-232/449
 - V.35
 - X.21
 - MIL-188
 - T1/PRI
- PC Remote Control

For more information, call (800) 638-2049; in MD (301) 353-1550.

Or write TTC at 20410 Observation Drive, Germantown, Maryland 20876.



Telecommunications Techniques Corporation

A DYNATECH COMPANY

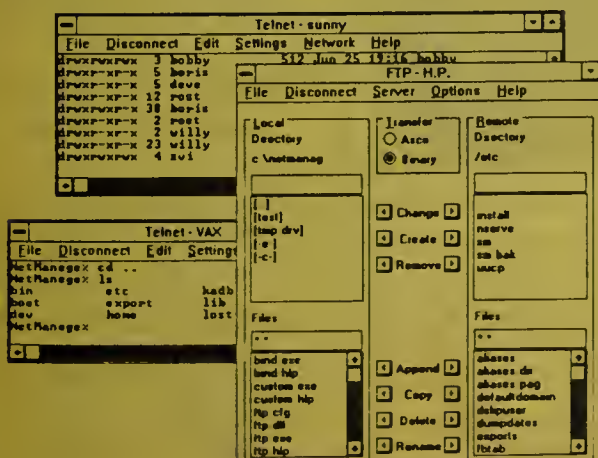
... EXPECT EXCELLENCE

Circle Reader Service No. 19

TCP/IP NETWORKING

TCP/IP for Windows 3.0

Chameleon is the first TCP/IP communications package developed specifically for Windows 3.0 (not converted from DOS), allowing multiple concurrent sessions with different accounts and hosts. **Chameleon** is the first TCP/IP applications package in the market implemented as a Windows Dynamic Link Library (DLL) and not a TSR, saving precious 640K base memory.



Applications:

TELNET (VT100)
FTP BIND
TFTP Statistics
SMTP Custom
Mail PING

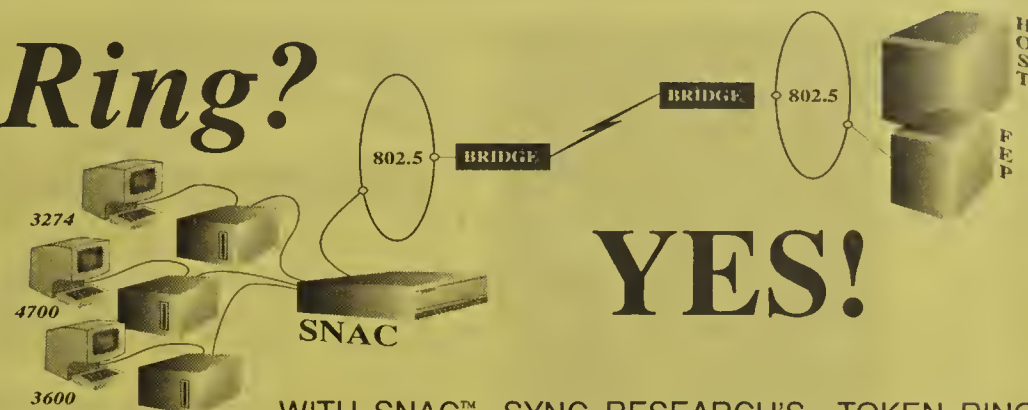
(408) 257-6404
NetManage

NetManage Inc.
10020 N. DeAnza Blvd.
Cupertino, CA 95014, USA
Fax: (408) 257 6405

Circle Reader Service No. 8

TOKEN RING CONVERTER

3274's On a Token Ring?



YES!

WITH SNAC™, SYNC RESEARCH'S TOKEN RING CONVERTER, YOU CAN CONNECT EXISTING "PRE-TOKEN RING" TERMINAL CONTROLLERS TO AN 802.5 TOKEN RING NETWORK.

- CONNECTS 3174s, 3274s, 4700s, 3600s AND OTHER PU2 CONTROLLERS TO TOKEN RINGS
- ELIMINATES MULTI-POINT SDLC LINES AND FRONT END PORTS

CALL 1-800-ASK SYNC for more information

SYNC RESEARCH

Circle Reader Service No. 6

V.32bis + V.42bis + G3FAX-HIGH SPEED MODEMS

Talk Fast - Talk for Less - Talk with ZyXEL

14.4Kbps - V.32bis+V.42bis+ Class 2 G3FAX, ZyXEL modems have it all :

- ZyXEL U1496B - PC Plug In Internal Card.....\$449*
- ZyXEL U1496E - Stand-alone external model.....\$469*
- ZyXEL U1496 - 20x2 LCD display, Menu Control 2/4 wire leased lines, V.33/V.29/V.27ter.....\$650*

*Special introductory price. Valid until December 31, 1991.

Low cost and high speed

ZyXEL modems let you talk fast with wide compatibility

- DTE speed up to 57.6 Kbps with CCITT V.42bis and MNP5 data compression
- High speed compatibility with V.32bis and V.32 and low speed compatibility with V.22bis at 2.4Kbps and V.22/Bell 212A at 1.2Kbps
- Industry standard V.42 /MNP4 error correction.
- Class 2 G3 Fax send and receive capability with PC FAX software

5 yr. warranty parts/labor - 30 day guarantee - free tech support

*Prices and model specifications are subject to change without notice. MNP5 is a trademark of Microcom Inc.



Dealer/VAR/Consultant discounts available

ZyXEL U - 1496

Call for Special Dealer Kit Savings
Talk to us today!
1-800-255-4101

NETWORKING

ZERO ONE NetWorking 4920 E. LaPalma Ave.

Anaheim, CA 92807 * Tel: 714-693-0333 Fax: 714-693-0705

One Call Does It All

Circle Reader Service No. 9

VOICE/DATA/FAX MULTIPLEXERS

STREAMLINE YOUR VOICE BANDWIDTH

And Integrate It With Fax and Data

The SDM-T Voice/Fax/Data Multiplexer—Flexibility Where It Counts

Our SDM-T is more than just a voice compression multiplexer. It's also a bandwidth manager for real-time fax and data. We call it the FLEXIPLEXER because it can dynamically allocate bandwidth—for voice, fax or data—when and where it's needed.

And there's more—the SDM-T provides outstanding paybacks when used with 56 Kbps to 128 Kbps transmission circuits.

And still more—the voice quality is excellent and doesn't change with system loading. You can even use the same fax machine for both on-net and off-net applications.



USE THE FLEXIPLEXER PLAN
Call for a live demo and get more details on the most flexible multiplexer in the industry. Call (800) FOR-ACT1 or (805) 527-2281



Advanced Compression Technology, Inc.

685 East Cochran Street
Simi Valley, CA 93065
(805) 527-2281
FAX: (805) 520-8099

Circle Reader Service No. 7

NETWORKING MARKETPLACE



UN-FRACTIONAL T1

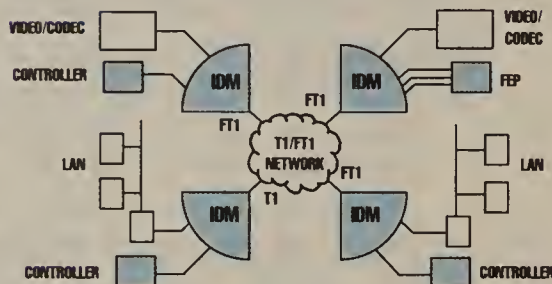
SCITEC IDM

Intelligent Digital Multiplexer

Until now Fractional T1 products had "fractional" features to match. The SCITEC IDM has all the features you'd never expect to find in T1 and FT1 access equipment.

Intelligence and features to create networks which provide integrated solutions.

- Up to 8 DTE ports
- N x 56, 64 data rates
- Hot-insertable cards
- Effortless user-interface
- ESF monitoring
- Comprehensive BERT
- Integrated CSU
- Remote configuration
- CEPT compatible



Discover the IDM, a T1/FT1 access product from a company committed to wide-area networking... worldwide.

Call Now...1-800-343-0928
Or Fax...1-401-849-8020

Scitec Communication Systems Limited • North America • Europe • Australia • Asia Pacific

DATA COMM

SAVE 50% & MORE
ON ALL PRODUCTS

BUY/SELL/NEW/USED

Reconditioned With Warranty

Modems • Multiplexers • T-1 •
CSU/DSU's • Channel Banks •

Codex CS 9600 FP Modem. \$199
T.P. 557 CSU/DSU 56Kbps. \$195
Infotron 790/990's 70% Off
Infotron T-1 Equipment ... 60% Off
Datatel 9100 CALL
Tellabs 440 and 445 50% off
Newbridge Channel Banks. \$4995
Omnimux 82 muxes-8 port.. \$695
N.E.T. IDNX Cards..... CALL
Equinox DS-15's..... CALL

METROCOM

(800) 364-8838

or (713) 783-8838

PUBLICATIONS



Patricia Seybold's
Office Computing Group

Free-Trial Offer

to

Network Monitor

Guide to Distributed Computing

Start a trial subscription to *Network Monitor*, the leading monthly report on distributed network computing.

After reviewing your first issue, you can either pay the bill and continue receiving *Network Monitor* or write "cancel" and owe nothing.

Fax, phone, or write us with your name and address. *Network Monitor* is priced at \$495 per year (Canada—\$507; foreign—\$519).

Fax: (617) 742-1028

Phone: (800) 826-2424 or
(617) 742-5200

Mail: 148 State St. 7th Floor
Boston, MA 02109

SOFTWARE

**PC BASED TELECOMM
SYMBOL ICON LIBRARY**

**MARKETING, ENGINEERING, &
CONSULTING PROFESSIONALS.**

750 TELECOMMUNICATIONS
SYMBOLS AND ICONS AVAILABLE
FOR VOICE, DATA & Networking

Use pre-drawn detail icons and symbols. Standardize your drawings & network diagrams. Create customized Engineering, Marketing presentations, and technical manuals Available in:
• Vectorized AutoCAD formats.
• Desktop Publishing & graphical formats (WMF, PCX, DXF, & DWG)

Order from: OSCG Inc. 1740 E. Gary Ave. Suite 109 Santa Ana CA. 92705
Tel: (714) 476-2404 Fax: (714) 476-2405
COMMART \$150.00

SAVE TIME

TRAINING

LAN
X25 • T1
Available Soon
FRAME RELAY

TELEtutor

**FREE
DEMO**

1-800-542-2242

FAX (603) 433-2260

CALL FOR CATALOG OF
ALL OUR COURSES



TeleCommunications
Training Monthly

VIDEO TAPE TRAINING

- X.25 Protocol Analysis
- SDLC/SNA Protocol Analysis
- ISDN BRI "The Basics"
- Switched Telephone Circuit Basics
- T1-Carrier
- Network Topology
- Local Area Network Protocols
- DataCom Concepts (RS-232-C)
- Analog Line Measurements
- Digital PBX
- Digital Voice Encoding

Call for Demo Tape
(215) 598-3293

NDIS

TRAINING

December 12, 13, 1991

March 12, 13, 1992

Thursday and Friday

Learn:

- Intricacies of NDIS
 - Control flow
 - NDIS driver design
 - Initialization and binding
 - Receive and transmit
 - NDIS data structures
 - Characteristics tables
- Review tested driver code segments

1-800-388-6284

9350 Gemini Drive
Beaverton, OR 97005
1 (503) 626-3081



LANs

NetMetrix

...to keep your net working!



◆ Protocol
Analyzer

◆ Load
Monitor

◆ NFS
Monitor

metrix
603-888-7000

Buying or selling
communications-related
products or services?

Or do you want to
announce an upcoming event
or business opportunity?

If so, Network World's
classified section is
the right choice for you.

You'll reach more than
150,000 communications/
networking professionals
all of whom are buying
decision makers.

And you'll reach them
every week.

Find out just how effective
and cost efficient
Network World classified
advertising can be.

For all the facts write or call:
Network World,
Classified Advertising

Joan Bayon Pinsky,
161 Worcester Rd,
PO Box 9172, Framingham,
MA 01701-9172;
800-622-1108
(in Mass., 508-875-6400)

Pacific & Mountain time zone
advertisers contact
Clare O'Brien at above
address and telephone.

Reminder:

**The Dec. 16th Issue
Closes Dec. 4th**

Dexpo West •

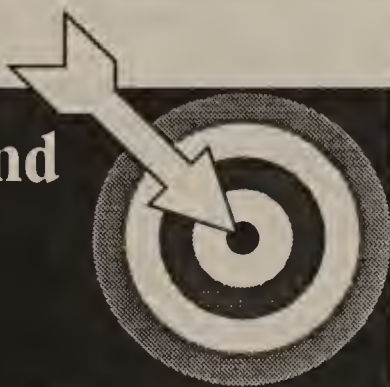
Special Dexpo West Show Issue • Dec 9

Closes: Nov 27th - Bonus Distribution

Call for further information on advertising in this Special Issue:
800-622-1108

NETWORKING CAREERS

When you need experience and education, *Network World* is right on target.

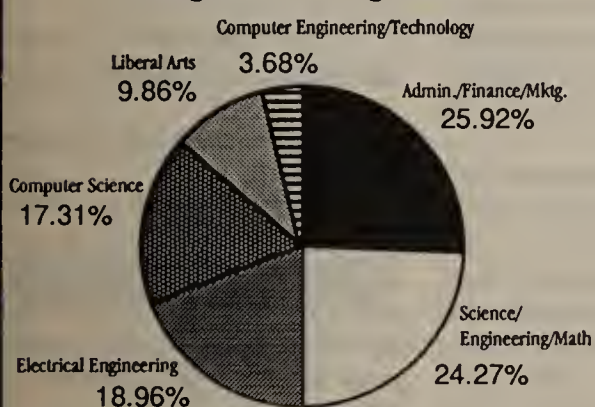


Network World readers are the most experienced and among the best educated networking and communications professionals in the industry. In fact, the typical *Network World* reader has over 10 years' experience in the profession and almost 5 years' experience at their current job function! And, their education is top notch. Over 72% of our readers have at least a Bachelor's degree and over 30% possess an advanced graduate degree.

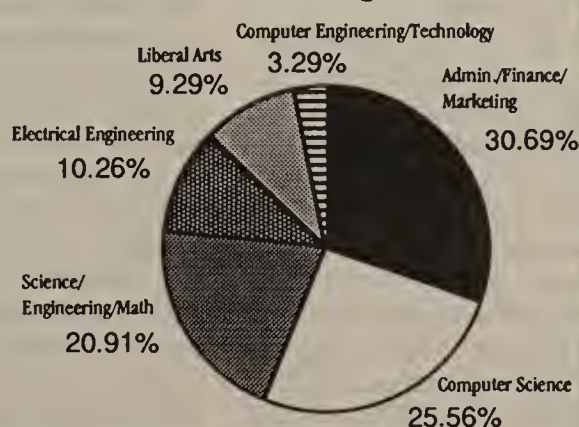
So if your company needs experienced and well educated networking and computer communications professionals - *Network World's Networking Careers* section is right on target. Call Bill Reinstein at (800) 622-1108 to place your ad or for more information.

Breakdown of *Network World* Reader's Undergraduate & Graduate Degrees

Undergraduate Degrees



Graduate Degrees



SOURCE: *Network World*, Audience Career-Skills Survey, 9/91 (1000 readers, "nth" name basis, 52.2% response rate) (Total %'s may exceed 100% due to multiple answers)

Your Next Job May be On-Line... ...On *Network World's* new *Networking Careers On-Line* that is !

Networking Careers On-Line gives networking and communications job seekers a new way to learn more about career opportunities advertised in *Network World*.

This new, free service, available through *Network World's On-Line Bulletin Board System*, was designed to provide you with the information you need to keep abreast of current opportunities and make informed career decisions. You'll see the text of an entire month's worth of *Networking Careers* employment opportunities as well as valuable additional background information on the advertising companies.

Networking Careers On-Line can be accessed 24-hours a day on the *Network World Bulletin Board System (BBS)*. Call today !

From any computer and modem, simply dial:

508-620-1160 [300-2400 Baud (8-N-1)]

508-620-1178 [up to 9600 Baud (8-N-1)]

WANTED

**Telecommunication Specialist
Traffic/Network Engineer
\$35K-45K Depending on Experience**

You are:

- Experienced in Traffic Engineering, Public Networks, Switches, Dialers, Store & Forward, 1+, 0+, Operator Services, Dedicated Lines, Least Cost Routing, Long Distance, LATA's, Rating, Billing and state tariffs.
- An excellent programmer familiar with IBM PC, Spreadsheets, and Dbase.

We are:

- Entrepreneurial in spirit.
- Extremely fast growing: 0-\$12 million/year in 2.5 years.
- A closely knit family.
- Extremely High Tech.
- Reward hard work generously.
- In the most desirable part of sunny California.

We will pay travel and moving costs.

SEND RESUME TO:

Farzad Mobin, Executive Vice President

Equal Access Corporation

11150 Santa Monica Blvd., Suite 360

Los Angeles, CA 90025

Voice: (800) 736-3533 Fax: (213) 445-5180



JWP Information Systems Network Services Group Communications

Infra-Structure Renewal Project

Washington State University and JWP Network Services are nearing completion of a contract for a Strategic Partnership in communications. This Strategic Partnership will include design, construction and implementation of a new voice-data-video communications network serving the entire WSU main campus in Pullman, Washington, representing a \$20 to \$25 million investment. JWP will begin recruitment for talented Engineers, Analysts and Technicians to join the CIR project team during November.

LAN/WAN Design Analysts

Individuals in this position will participate in the planning, design and implementation of intra and inter building backbones that will support the current LAN base as well as future expansion. The qualified candidate should have 5+ years experience with designing LAN configurations consisting of Bridges, Routers, Gateways, Thinner, Twisted Pair, Fiber Transceivers and Hubs. Experience with 10BaseT Hubs as well as SNMP based network management software is essential.

Voice/Data Cabling System Engineers

Individuals in this position will participate in the planning, design and layout of cable pathways, terminations, cross connecting systems, patching systems, and IDF's as well as specifications for Fiber and Copper media. The qualified candidate should possess a degree from an accredited 4 year college as well as 5+ years experience in designing and layout of Fiber and Copper cabling plants in a multi-building environment. CAD experience is essential. PDS certification as well as the BICSI RCDD is desirable.

CATV Design Engineers

Individuals in this position will participate in the planning, design and implementation of a campus wide SMATV network that will support all academic video presentation and production needs as well as provide for video conferencing for administrative and instructional purposes. The qualified candidate should possess an Electrical Engineering degree from an accredited 4 year college as well as 5+ years experience in designing and layout of SMATV networks including central switching. CAD experience is essential.

Interested and Qualified candidates should forward their resume, salary history and availability to:

Washington State University
JWPIS, CIR Project
c/o John Lambert
Pullman WA 99164-1208

JWP is an AA/EOE - Protected group members are encouraged to apply and to identify their status. No phone calls accepted.

Management Information Systems Analyst

Perform systems analysis, development, programming, documentation and maintenance functions in support of multi-user applications software. Integrate existing independent departmental multi-user network systems through a central server (LAN), allowing all departments global access to information. Evaluate data processing needs and recommend hardware and software to management. Provide technical support and train staff as needed. Position requires a B.S. degree in Computer Science and two years experience as a programmer/analyst. Knowledge of PC-MOS multi-user and multi-tasking operating systems; PASCAL, 8080 Assembler, and "C" programming languages; dBASE and Clipper applications software required. 40 hours per week, 8 a.m. to 5 p.m.; compensation of \$33,500 per year. Send resume with Social Security number to Indiana State Employment & Training Services, 10 N. Senate Ave., Indianapolis, IN 46204, Attn: W.F. Shepherd. Include I.D. No. 3288182 with response.

For Information
On Advertising
In *Networking
Careers* Call
Bill Reinstein or
Pam Valentinas

at
1-800-622-1108
(in MA
508-875-6400)

TI's global net instrumental

continued from page 37

dors its requirements for products, which often become the baseline for future releases.

Data center consolidation

These practices, combined with the decline in long-distance prices and TI's growing use of fiber in its network, have made it possible for TI to consolidate its data centers.

The company is finding it

TI has designed its network with physically diverse long-haul routes to every TI site.

▲▲▲

more economical to transport data back and forth between Dallas and remote sites than operating and staffing multiple data centers.

Since 1986, TI has cut the number of data centers from 36 to five — two in the U.S., one in Japan, one in Singapore and one in Italy.

By 1993, TI intends to consolidate all data processing into one megacenter in Dallas and use IBM's Business Recovery Services for disaster recovery. This consolidation will save the company \$21.5 million per year in hardware rental costs, software licenses and staffing.

This summer, the firm shut down its data center in Bedford, a move that will save the company \$3.6 million per year, even after it pays an additional \$1 million a year in communications costs.

Yet while TI is growing its network capacity by about 15% per year to support data center consolidations, the company's network operating budget has remained constant at \$50 million for the past several years, Chrisman says. This is due to better volume discounts TI has been able to negotiate and the declining price of network services.

Although consolidating data centers can save a company millions of dollars, Chrisman points out that those cost savings can be quickly erased by one or two network outages.

So TI has designed its network with physically diverse long-haul routes to every TI site. Should one link fail, the IDNX switches automatically reroute data traffic from the failed T-1 to available channels on an alternate T-1 while voice traffic is moved onto the public network.

TI is also improving its network management capabilities so it can spot potential circuit failures before they occur. Besides the CCM and CRM tools, TI recently implemented NET's Network Management System to manage the wide-area network.

TI also recently implemented Cabletron Systems, Inc.'s Spectrum network management product, which enables it to manage Vitalink bridges and Cisco routers. The Spectrum system is integrated with Novell's LanTern LAN management system, which monitors the size and number of packets flowing across the network. And TI uses IBM's NetView to manage its SNA net.

TI's ultimate goal is to manage the network down to the workstation level and eliminate the need for human intervention, a blue-sky concept Sam Shuler, TI's communications strategy manager, calls "lights-out networking."

Shuler says the idea of lights-out networking — in which networks become self-managed and self-healing — will be achieved using object-oriented management capabilities spelled out in the Open Software Foundation, Inc.'s Distributed Management Environment, a suite of software that vendors will use to build integrated, multivendor network and systems management products.

According to Shuler, TI plans to manage end-user workstations from a central site by embedding them with Simple Network Management Protocols or Common Management Information Protocol agents.

Future releases of hub concentrators will incorporate additional network management capabilities for managing LAN environments.

TI is improving its net management capabilities so it can spot potential failures before they occur.

▲▲▲

Some may say a lights-out net management system is too lofty and idealistic a goal to be achieved. However, it may not be beyond TI's grasp given its networking track record during the past 20 years and its innovative use of technology to achieve a competitive edge.

Who knows? In the next 20 years, lights-out networking could ensure 100% network and system availability, and leave TI's regular morning review meetings to focus on how well its management systems perform. □

Like many other cities, New York is in financial straits. Budgets are being cut, thousands of city workers are losing their jobs and essential services are being dramatically curtailed.

It is a time for every city agency to tighten its belt and shave operational costs. And New York's Computer and Data Communications Service Agency (CDCSA) is doing just that.

Two years after installing Citynet, an IBM Systems Network Architecture net linking 50 city facilities to 11 city and seven noncity data centers, the agency has realized a onetime savings of more than \$25 million. That feat has earned the company an honorable mention in *Network World's* User Excellence Awards.

The savings are due to the consolidation of several SNA networks into one and leasing cheaper circuits from the local telephone company.

The way it was

In 1985, when the city first decided to evaluate its data networking infrastructure, each of the 18 data centers operated and managed its own network, leasing 9.6K bit/sec lines from New York Telephone Co.

Workers at different city agencies accessed one data center per leased line, which formed a series of star networks emanating from each data center. When a user needed to access another data

center, an additional line had to be leased.

"We had multiple circuits going to the same building, sometimes to the same floor," says CDCSA Commissioner Joseph Giannotti. "When you're crisscrossing the city with circuits, you're just spending more [money]. You shouldn't have to run a circuit to every system you want to access."

Prior to Citynet, each of the 2,000 point-to-point analog and digital circuits CDCSA leases from New York Telephone cost \$400 per month. Citynet, which cost \$30 million to build and became fully operational in September 1989, has lowered the cost of each leased line to \$40 per month.

Instead of running lines directly from user sites to data centers, Citynet's lines run to a New York Telephone central office site and then to wire centers at city facilities near of those central offices. The wire centers are connected to two main switching hubs, reducing the net's complexity from a series of star nets to two star networks.

The hubs comprise IBM 3745 and 3720 front-end processors, which are connected over a T-1 line. New York Telephone Digi-path 1 56K bit/sec lines fan out from the hubs, which perform much like routers, to IBM 3720 front ends for IBM mainframes at each data center.

Six years ago, the U.S. Bureau of Export Administration was struggling to process 130,000 export license applications per year and was taking an average of 60 days to handle each one. Applications were frequently lost or delayed, research on the export history of a given company or product was painfully slow, and information sharing with other agencies, such as the Department of Defense or Department of State, was less than elegant.

Today, thanks to its new Fiber Distributed Data Interface network, the Export Bureau can process applications electronically and has slashed the average processing time for each application to an average of 16 days.

By drastically cutting the applications processing time for exporters, the bureau saves U.S. industry about \$1 billion per year, says John Young, director of the Office of Information Resource Management at the Export Bureau. In addition, by allowing exporters to begin shipping products more quickly, the network has helped make U.S. exporters more competitive.

For these accomplishments, the Export Bureau received an honorable mention in *Network World's* User Excellence Awards.

The bureau's network, installed in 1989, comprises five token-ring local-area networks linked to an FDDI backbone. The net supports 500 export agents in Washington, D.C. in addition to agents in field locations. It also enables the Export Bureau to notify other government agencies when export applications are

The bureau saves U.S. industry about \$1 billion per year.

▲▲▲

ready for their review.

When the Export Bureau sat down to draw up a plan for a new network, "the desire was to better serve the industry — to lose fewer applications [and] to process them better," Young says.

Speeding the processing time was also important. "If a Japanese salesman and an American salesman are [competing for a customer], and the American guy says it's going to take four to six

"We're basically renting the local loop," Giannotti says of the central office-to-wire center design. "We never cross central office boundaries."

Before Citynet, CDCSA leased lines crossed those boundaries, which reflects the higher cost. By installing the wire centers and leasing New York Telephone's Local Area Data Circuits, the city is realizing a 90% reduction in the cost of leased lines.

Local Area Data Circuits, which are copper analog circuits accessed by city agencies through limited-distance modems, are much cheaper than the lines CDCSA leased previously because they only pass through one central office. If they crossed central office boundaries, they would be

“We’re basically renting the local loop.”

▲▲▲

much more expensive, according to Giannotti.

Inexpensive routing of SNA isn't enough for Citynet, however. CDCSA is currently evaluating multiprotocol routers so local-area network traffic can share the same backbone and tail circuits as SNA traffic.

— Jim Duffy

weeks to get an export license, and the Japanese guy says two weeks, guess who's going to get the contract?" Young asks.

But speeding the process was not the only goal. "If you want to do things faster, you just get a rubber stamp and don't worry about it," he says. "[The new network] was not aimed only at doing things faster."

As an example, Young says the network helps the Export Bureau to randomly audit exporters in order to verify that they have all of the necessary documentation after an export license is granted. The regulations have changed so exporters generally do not have to submit documentation; they simply report having it to the agency, so such audits are needed, he says.

One of the big advantages that the FDDI network brings to the Export Bureau is the ability to electronically receive applications. Young says about half of all applications are received via an electronic data interchange system and the other half are scanned into the system using an optical character reader. Exporters that submitted applications electronically receive licenses the same way.

— Anita Taff

WorldCom looks for mate

continued from page 4

sought to at least maintain majority control over WorldCom's European operations.

But the sources said no equity deal has been finalized, contrary to other press reports. WorldCom has discussed partnering with virtually every U.S. carrier except AT&T and MCI, they added.

While declining to confirm or deny the negotiations, Roan Scraper, WorldCom's chief operating officer, said he is very impressed with WilTel. "If we were looking for a domestic association, WilTel would be the kind of company we'd like," he said.

Analysts said an equity partnership between WorldCom and WilTel could benefit users and the two carriers. WorldCom could

use WilTel's domestic facilities, while WilTel could use WorldCom's international facilities.

Since WilTel offers no international services, it refers international customers to WorldCom, according to a WilTel spokesman.

"WilTel could be a strong, long-term strategic partner for WorldCom," said Daniel Briere, president of TeleChoice, Inc., a consulting firm in Montclair, N.J.

Despite the turmoil, WorldCom customers expressed confidence in their carrier.

"We've had good relations with them — in some cases, better than expected," said William Klauk, communications operations manager for Continental Grain Co., which began leasing a 128K bit/sec transatlantic circuit from Worldcom this spring. "Do I expect them to stop giving us support? I don't think so." ■

Cabletron adds hub cards

continued from page 6

The TRMM can be operated via a hub-attached console or in conjunction with any Simple Network Management Protocol-based net management software package, such as Cabletron's Remote LANView/Windows and Spectrum offerings. Using Re-

mote LANView/Windows or Spectrum with the TRMM, users can isolate the port connected to a station and disable it, Frechette said.

Initially, the TRMM will be able to monitor and collect statistics on only one token-ring net per hub, unless the user employs an external bridge to link multiple token-ring nets.

Cabletron plans to incorporate source-routing bridging technology into the token-ring net management module by the end of the first quarter of next year.

Frechette also said the module's flash erasable programmable read-only memory chips allow users to upgrade on-board software as new capabilities are announced.

Cabletron's TRMM is priced at \$4,995 and has begun shipping.

Graham Morrison, project leader for LAN development at Blue Cross/Blue Shield of Connecticut in North Haven, Conn., said his company recently acquired nine Cabletron hubs equipped with the new token-ring net management modules.

"The module has the power to gather and calculate statistics and present them with great speed in a graphical format on a network management workstation," Morrison said.

Cabletron's new token-ring modules, the Token-Ring Media Interface Module-24 Active (TRMIM-24A) for unshielded twisted-pair and TRMIM-44A for shielded twisted pair, will let users double the port capacity from 84 to 168 ports on an eight-slot MMAC, from 60 to 120 on a five-slot MMAC and from 24 to 48 on a three-slot MMAC.

The new modules are based on active circuitry, which means that data signals are regenerated at each network interface port within the hub to minimize distortion.

The TRMIM-24A and TRMIM-44A are priced at \$3,795 each and are available now. ■

N.Y. carriers back mutual aid

continued from page 1

The mutual aid plan, backed by AT&T, MCI Communications Corp. and US Sprint Communications Co., among others, is just one of several actions outlined in a report issued by the Mayor's Task Force on Telecommunications Network Reliability, a consortium of public and private sector members formed in August 1990.

The task force comprises large users such as American Express Co., The Chase Manhattan Bank, N.A., Goldman, Sachs & Co. and the Communications Managers Association; carriers, including AT&T, MCI and US Sprint; and others, such as government agencies and members of academia.

The report, "Continuous Communications: Enhancing Network Reliability through Cooperation," lays out plans for a series of disaster simulations to assure that the failure of one lo-

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

"AT&T will find any excuse not to follow through with this [undertaking]."

▲▲▲

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

cal switching office does not disrupt the entire public network. It also advocates teaming with the Real Estate Board of New York to address issues such as diverse transmission paths and access for multiple providers into large office buildings.

Network World Advertising Sales Offices

NATIONAL SALES MANAGER

Don F. Malmmeister
(708) 297-8855/FAX: (708) 827-9159

BOSTON

Donna Pomponi, District Manager
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853

NEW YORK

Paul Bonington, District Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, N.J. 07662
(201) 587-0090/FAX: (201) 712-9786

NEW JERSEY/PHILADELPHIA/D.C.

Joan Daly, Eastern Regional Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, N.J. 07662
(201) 587-0090/FAX: (201) 712-9786

CHICAGO

Don F. Malmmeister, National Sales Manager
Dan Gentile, District Manager
Kathy Mazze, Sales Assistant
10400 West Higgins Rd., Suite 300
Rosemont, Ill. 60018
(708) 297-8855/FAX: (708) 827-9159

SAN FRANCISCO

Chris Curry, Western Regional Manager
Sandra Kupiec, District Manager
Lonnie Forbes, Sales Assistant
Beverly Davis, Sales Assistant
2083 Landings Drive, Mountain View, Calif. 94043
(415) 691-0510/FAX: (415) 691-0525

ATLANTA

Don Seay, District Manager
1400 Lake Hearn Dr., Suite 330, Atlanta, Ga 30319
(404) 394-7509/FAX: (404) 255-5123

LOS ANGELES

Richard Carlisle, District Manager
Karen Silverstein, Sales Assistant
18008 Sky Park Cir., Suite 145, Irvine, Calif. 92714
(714) 250-3006/FAX: (714) 250-4881

RESPONSE CARD DECKS

ACTIONCENTER

NETWORKING MARKETPLACE

Joan Bayon Pinsky, Sales Director
Clare O'Brien, Account Executive Western Region
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, Mass. 01701
(508) 875-6400/FAX: (508) 651-1853

RECRUITMENT ADVERTISING

William Reinstein, National Sales Director
Pam Valentinas, District Manager
Christie Sears, Sales Assistant
(508) 875-6400

ADVERTISING OPERATIONS

Karen Wallace - Manager of Advertising Operations
Linda Miller - W. Region Account Coord.
Barbara Hill - Classified Account Supervisor
(508) 875-6400

Network World, Inc.

An IDG Company
Network World Headquarters:
161 Worcester Road, Framingham, Mass. 01701
Phone: (508) 875-6400/FAX: (508) 879-3167

Colin Ungaro - President/Publisher
Mary Fanning - Dir. of Financial Operations
Nanci Farquharson - Adm. Assistant
(508) 875-6400

MARKETING

Evilee Thibeault - Director of Marketing
Carol A. Leonard - Marketing Specialist/Events
Julianne Jeremiah - Mktg. Specialist/Promotion
(508) 875-6400

RESEARCH

Ann MacKay - Research Manager
(508) 875-6400

CIRCULATION

Richard Priante - Director of Circulation
Renee Visconti - Fulfillment Manager
Bobbie Cruse - Customer Service Rep.
Edna Clifford - Circulation Assistant
(508) 875-6400

PRODUCTION

Ann Finn - Production Director
Cheryl Rothman - Senior Production Coordinator
Anne Rosenkranz - Imaging Manager
Terri Mitchell - Production Assistant
(508) 875-6400/FAX: (508) 875-3090

REPRINTS

Donna Kirkey - Reprint Coord./Graphic Designer
(508) 875-6400

LIST RENTAL SERVICES

Loel Westermann - List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700

INFORMATION SERVICES

Jeff Pennett - Director of Info. Services
Jack McDonough - Mgr. of Info. Services
(508) 875-6400

DISTRIBUTION

Boh Wescott - Distribution Manager
(508) 879-0700

IDG

Patrick J. McGovern - Board Chairman
Walter Boyd - President
William R. Murphy - Vice-President Finance
Robert Farmer - Vice Chairman

Network World is a publication of IDG, the world's largest publisher of computer-related information. IDG publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more IDG publications each month. IDG contributes to the IDG News Service offering the latest on domestic and international computer news.

NETWORK WORLD

▲▲▲

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: \$5.00 a copy; U.S. — \$95 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (air-mail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

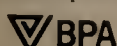
Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

Copyright 1991 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.



Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

NET embraces DME as base

continued from page 1

net management applications.

Analysts applauded the move.

"It's the first time I've seen a company really take to heart the movement in network management, and that is to get out of the platform business, get out of the protocol business and get into the application business," said Nick Lippis, a principal at Strategic Networks Consulting, Inc., based in Rockland, Mass.

The DME strategy is a long-term one. DME software will not be available from the OSF until mid-1992, which means NET products based on the DME aren't likely to ship until 1993.

In the meantime, NET will develop NetOpen applications to its own application program interface (API), which connects the applications to a set of DME-like services such as event handling and data management. Both the API and the services will eventually be swapped out for comparable DME tools as they become available, Mashima said.

Jonathan Gossels, business area manager for the OSF, said he expects NET to be the first of many vendors announcing sup-

port for the DME.

"I've had conversations with several companies in the communications industry — T-1 vendors and other communications vendors — in recent weeks, and the interest in the DME has been striking," Gossels declined to name any of those vendors.

Among NET's first NetOpen applications is the Virtual Network Application (VNA), which allows users to logically partition an IDNX network according to application, line of business or other criteria. It is similar in function to a capability that Newbridge Networks, Inc. announced last summer and Netrix Corp. supports for its #1-ISS T-1 circuit/packet switch.

VNA consists of software that runs on a Sun Microsystems, Inc. SPARCstation connected to an IDNX node. A single VNA implementation can support as many as 16 logical networks, each of which can be monitored and controlled separately from an X Window System terminal.

VNA differs from Newbridge's partitioning capability because it does not require users to define the physical network paths between end points in each virtual network, Mashima said. Instead, users simply define the input and

output ports for each virtual network circuit, and the IDNX nodes find the optimum network path.

Newbridge, by contrast, requires users to define the primary path through a network for each virtual net as well as a backup path in case of failure. That means spare bandwidth must be provided for each virtual net.

"The interest in the DME has been striking," the OSF's Gossels said.

▲▲▲

VNA lets all 16 virtual networks share the same pool of spare bandwidth, Mashima said.

Rick Malone, a principal at Vertical Systems Group, a consultancy based in Dedham, Mass., said there are advantages to both products. "[VNA] doesn't limit the user to a fixed physical path. That's a positive," Malone said. But carriers, for example, prefer to know the path that each circuit is taking, which makes the New-

bridge approach a better choice for them, he said.

VNA is available now. Pricing starts at \$30,000.

Other NetOpen applications announced last week include the NetOpen/Series 5000-S, an entry-level version of the existing Series 5000 IDNX net management system. Like its big brother, the Series 5000-S runs on a SPARCstation but supports a single user console and as many as 75 network elements, as opposed to thousands of elements on the larger system.

Scheduled for availability by mid-1992, the Series 5000-S can be upgraded to a Series 5000 and is priced from \$9,950, as compared to about \$25,000 for the Series 5000.

NET also announced the NetOpen/Expert Fault Management System (EFMS)-Global, which is an international version of its existing EFMS. Both packages are expert systems that help users troubleshoot IDNX networks, but the global version does not include features that monitor data service unit/channel service units and T-1 circuits.

Scheduled for mid-1992 availability, EFMS-Global costs about \$15,000, approximately half the price of the existing EFMS. ■

DEC, Microsoft team on plan

continued from page 1

is precisely what [users] need." Users reacted cautiously to DEC's Windows strategy and closer ties with Microsoft, given what little has come of its partnership with Apple Computer, Inc., they said.

"It sounds interesting; these are two important groups," said Harvey Shrednick, vice-president of information services at Corning, Inc., in Corning, N.Y. "But seeing is believing. Who knows if this is going to work. Nothing has effectively materialized from Apple and DEC. We expected a lot more."

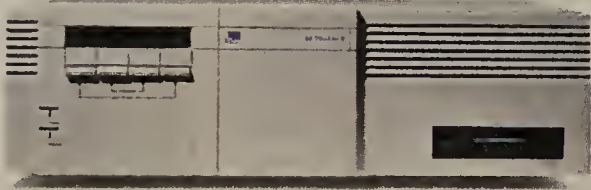
Dick Crane, director of communications at Massachusetts General Hospital in Boston, said, "The proof will be in the pudding. Microsoft has delivered, and DEC has not on applications. I hope this isn't like DEC-Apple."

New offerings

The new work group wares include Pathworks Links, which had been code-named Pathworks-Plus, and TeamLinks for Pathworks. These software products form the foundation of the Windows into the enterprise suite.

Introducing NETBuilder combination of power.

Imagine upgrading your network by adding boards to a bridge/router you need never turn off. Imagine your data



NETBuilder II

moving rapidly from network to network without bottlenecking, thanks to the muscle of a RISC processor. And imagine, too, a bandwidth capability wide enough to handle the bulge of video, text and multi-media data.

All this is found in the new NETBuilder® II. It is quite simply the most potent combination of technology in networking today. NETBuilder II harnesses RISC, FDDI and an 800mbps backplane to an ASICs design that reduces the number of



Pathworks Links Version 1 is a set of client and server software modules and program interfaces that integrates Windows clients connected to a VMS-based Pathworks server into a corporate network. The software lets users access files and communicate with others through Windows icons and menus.

Pathworks Links provides file conversion capabilities and supports electronic conferencing. It includes All-In-1 Mail for Windows, DEC's new X.400 messaging tools for Windows clients in an All-In-1 office environment, which allows users to exchange messages with users on other X.400-compliant systems.

TeamLinks for Pathworks includes all components of Pathworks Links, plus All-In-1 Integrated Office System's file cabinet, which enables Windows users to share files, data and documents in real time across work groups and multiple LANs. It also includes a work flow automation application called TeamRoute, which routes and tracks forms as well as documents throughout the enterprise net.

TeamLinks for Pathworks also integrates Microsoft's Word for Windows and Excel for Windows applications with X.400 mail,

CDA document and file conversion libraries, as well as shared filing capabilities.

Both Pathworks Links and TeamLinks for Pathworks require Pathworks for Windows, client software for desktop-to-server connectivity.

Analysts said the DEC offerings are designed to boost the ap-

“DEC's reliance on VMS is going to be a problem in bringing in new customers.”

▲▲▲

peal of its minicomputers as LAN servers, but they questioned whether the company will be successful in reaching out beyond its installed base — particularly since Pathworks Links and TeamLinks are tuned to work with DEC's proprietary VMS operating system.

“DEC's reliance on VMS is going to be a problem in bringing in new customers” because users are looking more for open system

solutions, said Ann Palermo, director of office systems research at International Data Corp. in Framingham, Mass.

Growing partnership

Under its expanded development and distribution partnership with DEC, Microsoft will develop versions of its Windows applications that work with DEC's CDA architecture and other NAS services for distributed data access. Microsoft will also integrate Windows applications with TeamLinks for Pathworks and Pathworks Links.

For its part, DEC will distribute and support Microsoft's Excel for Windows; Word for Windows; PowerPoint for Windows, a presentation graphics program; Project for Windows; and Visual Basic.

Pathworks Links, expected to be available in December, is priced at \$257; components can be purchased separately. All-In-1 Mail for Windows is expected to be available in January.

TeamLinks for Pathworks is priced at \$550, or \$995 when bundled with Microsoft Word for Windows, Microsoft Excel for Windows or Microsoft PowerPoint for Windows. It is expected to be available in March. **Z**

Net approved by the House

continued from page 2

ment funding of gigabit-speed equipment unrealistic and poor policy.

The final version of the bill calls for the president to implement the National High-Performance Computing Program and establish policies for management, access, operation and evolution of NREN.

The bill calls for the National Science Foundation NSF Network, the Internet's current backbone network, to serve as the foundation for NREN. But the bill eliminated Gore's earlier requirement that NREN support gigabit speeds end to end and be fully funded by the government.

Instead, the bill asks that only portions of NREN be capable of gigabit speeds “to the extent technically feasible,” and asks the National Institute of Standards and Technology to develop and propose standards and guidelines for NREN.

Although the bill still asks for as much as \$1.5 billion in funding for all the supercomputer and network projects envisioned by the Gore bill, the new compromise language now gives the

president's Office of Management and Budget greater control over the annual spending of each agency involved in the project.

The bill also calls for greater industry participation through contributions to NREN's technical evolution and emphasizes purchase of off-the-shelf gear.

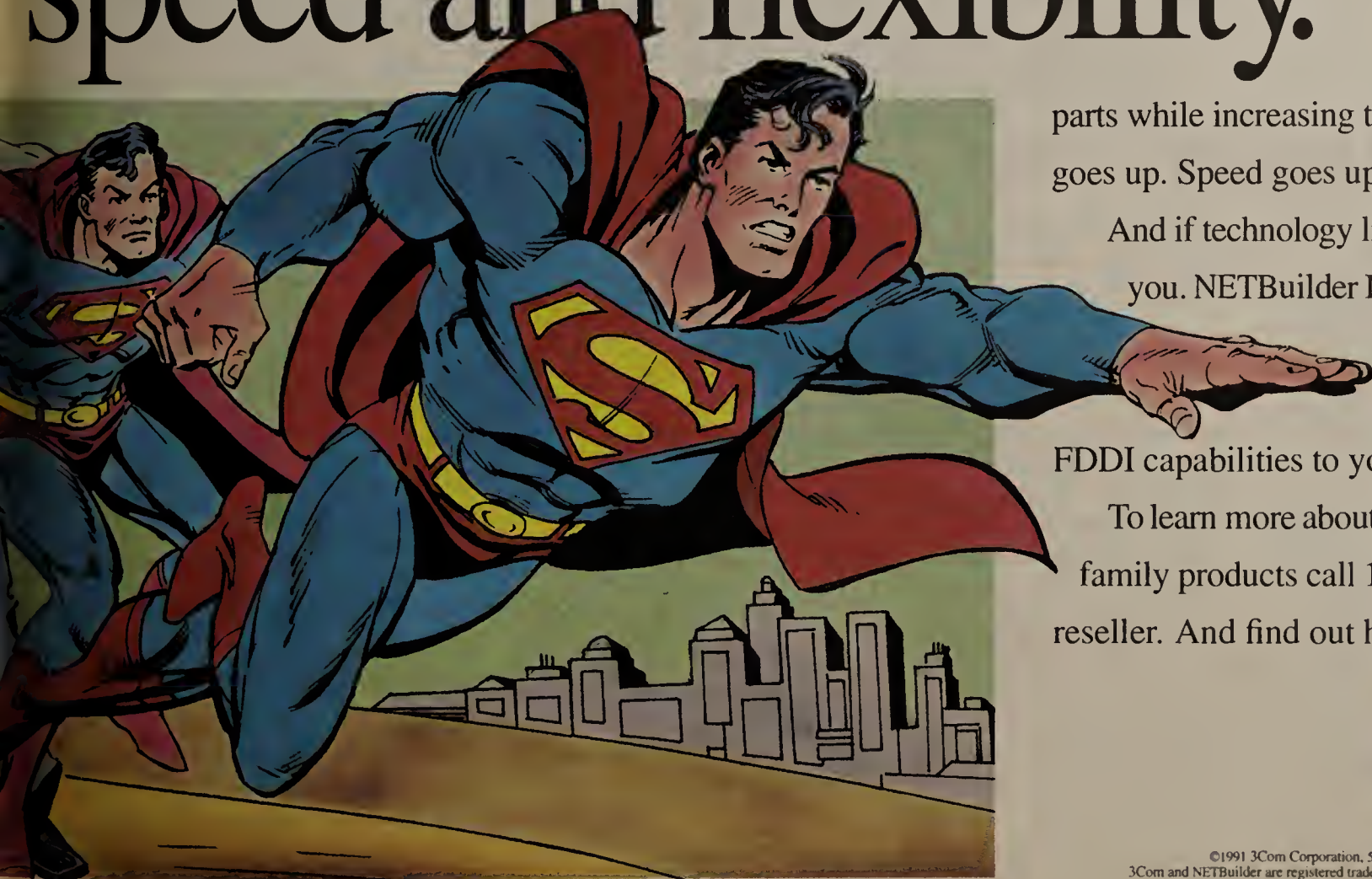
The bill ditches the protectionist House language, but gives the nod to congressional concerns about U.S. global competitiveness by ordering NREN coordinators to submit an annual report on any program grant to foreign companies.

Although the Bush administration still opposes portions of the bill — such as the use of government computer database information as an NREN service — a veto is not expected.

However, some political obstacles still remain in the area of funding, which originates in various congressional appropriations committees.

Although Congress has approved next year's funding for the five-year supercomputing and network projects envisioned in the bill, the Senate has yet to approve the last \$232 million needed for the Defense Advanced Research Projects Agency's role, a Gore aide said last week. **Z**

II. An almost impossible speed and flexibility.



parts while increasing the number of product functions. Power goes up. Speed goes up. Maintenance goes down.

And if technology like this sounds expensive, let us reassure you. NETBuilder II's price is among the most competitive you'll find. What's more, NETBuilder II is the most cost-effective way to add FDDI capabilities to your network.

To learn more about NETBuilder II and the other NETBuilder family products call 1-800-NET-3Com. Or visit your 3Com reseller. And find out how your network can really take off.



©1991 3Com Corporation, 5400 Bayfront Plaza, Santa Clara, CA 95052. Telephone (408) 764-5000. 3Com and NETBuilder are registered trademarks of 3Com Corporation. SUPERMAN is a trademark of DC Comics Inc. ©1991

MEET OUR MANAGEMENT TEAM

"No two networks are alike. By manufacturing and developing the industry's broadest product line, we can tailor any network to our customers' needs."

S. Robert Levine
President & CEO



Ethernet, Token Ring and FDDI

At Cabletron Systems, we recognize the integrated networks of today provide your company with the competitive advantage it needs tomorrow. In response to your needs we've developed the broadest product line of leading-edge technologies that fully integrate under Cabletron's powerful network management umbrella.

Intelligent Hubs

Cabletron's Multi Media Access Center intelligent wiring hub series connects Ethernet, Token Ring and FDDI local and wide area networks together in a single chassis. Our other hub products include standalone devices for 10BASE-T and Token Ring smaller connectivity environments.

Management Platforms

Remote LANVIEW®/Windows, the industry's first management software solution for SNMP

Ethernet and Token Ring networks, was the world's first network management software package to offer completely integrated worldwide desktop LAN/WAN management from a central control console.

And now we've brought network management to a new level with SPECTRUM™, Cabletron's advanced management platform, that goes far beyond the current generation of management systems to provide a cohesive, powerful and flexible environment for managing multi-vendor networks.

CABLETRON
SYSTEMS^{INC.}

The Complete Networking Solution

Corporate Headquarters

35 Industrial Way, Rochester, NH 03867-5005
(603) 332-9400

Desktop Connectivity

Of course there's more, including Cabletron's own Ethernet and Token Ring Desktop Network Interface (DNI®) adapter cards, the industry's first manageable adapter card solution; as well as our entire line of manageable 10BASE-T and Token Ring connectivity products.

It is easy to see why Cabletron has become the leader in network management technologies. That's why over 22,000 customer sites already use our products to connect more than 2 million network nodes. Use Cabletron's network management team to give your company the competitive edge it needs.

With more than 35 offices worldwide, there's a Cabletron location near you. Call us today at our headquarters for our product brochures or to arrange a live demonstration.

European Headquarters: Network House, Newbury Business Park, London Road, Newbury, Berkshire, England RG13 2PZ 011 44 635 580000